

# FLIGHT

The  
AIRCRAFT  
ENGINEER  
&  
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

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## Flight

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### DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

- May 20 to 30 Pan-American Aeronautic Congress at Atlantic City.
- May 22 and 23 Aviation Competition at Juvisy in connection with Fêtes de Paris
- May 23 to 30 Seaplane Contests at Barcelona.
- June 22 ... Wilbur Wright Memorial Lecture, H.R.H. Prince Albert presiding, at 8 p.m., at Central Hall, Westminster. Commander J. C. Hunsaker will read a paper on "Naval Architecture in Aeronautics."
- July 9 to 20 S.E.A.C. International Aero Exhibition at Olympia
- July (mid.) Seaplane Contests at Antwerp
- July 24 ... Aerial Derby.
- Aug. 3 ... Air Ministry Competition (Large and Small Type Aeroplanes)
- Aug. (end of) Schneider International Race, Venice.
- Sept. 1 ... Air Ministry Competition (Seaplanes)
- Sept. ... International aviation week (with competitions) at Brescia, Italy
- Sept. 27 to Oct. 3 Gordon-Bennett Aviation Cup, France
- Oct. 22 ... Gordon-Bennett Balloon Race, Indianapolis, U.S.A.

## EDITORIAL COMMENT



### Chaotic R.A.F. Accounts

White Paper recently issued gives a statement of the Appropriation Accounts of the Royal Air Force for the year ending on March 31, 1919. It shows a total of votes of credit of £84,413,445 and, with appropriations in aid in excess of estimate, of £85,437,384. Of the period covered by the accounts, 8½ months were war months, when expenditure was heaviest, and large as the sums involved appear to be they are by no means representative of the whole expenditure on Air Force services. All engines and machines supplied were, for example, charged to the Votes for the Ministry of Munitions, while stores and equipment issued to units serving with the Expeditionary Forces were carried in the Army Estimates.

The Comptroller and Auditor-General has some very unkind remarks to make about the want of system of accounting in the R.A.F. He says that "the standard of store-keeping and accounting for Air Ministry stores had been deplorably low. At several important stations it had been necessary, with Treasury approval, to disregard the accounts as valueless, and, at others, Courts of Enquiry or other investigations into losses and discrepancies had revealed an almost chaotic condition of affairs, and such as, in relation to issues to Allied Governments and contractors, might lead to serious loss of public funds." An instance is quoted of the issue of 203 machines from one depot to an Allied Government between June and November of 1918, which had not been claimed for until quite recently.

We realise the difficulties under which the accountant branch of the R.A.F. had to carry on its duties. The Force only came into being on the 1st of April, 1918, and succeeded to two separate and distinct methods of store-keeping and accounting. The affairs of the R.N.A.S. had been dealt with according to the routine laid down for ships of the Royal Navy, while those of the R.F.C. were kept in accordance with the instructions of the Army Council. It is not all certain, besides, that a good deal of the chaos upon

which the Comptroller is justifiably severe was not left as a legacy to the newly constituted Air Force. Moreover, the exigencies of war and the consequent vast expansion of the aerial arm led to a state of liquidity in the Force which could not possibly obtain in normal times of peace. The constant formation of new units and the need for replacing casualties overseas meant that, during the period under review, the whole Force was in a constant condition of change which made it next to impossible to keep track of transactions on the stupendous scale upon which they naturally arose. Therefore, although in the ordinary way we are not inclined to look with a lenient eye on slackness in the public service, particularly where it involves serious waste or loss of public funds, we are not inclined to judge too hardly.

At the same time, it is undoubted that there was an appalling amount of unnecessary slackness in carrying out regulations relating to stores and accounts generally. After all allowances have been made for the stress and strain of war conditions, and for the inexperience of staffs, it must be said that there was far more unnecessary waste than ought to have been incurred if administration had been on a proper basis. It was not only at stations that lapses occurred. The Air Ministry itself seems to have been deplorably slack in the manner in which it dealt with expenditure. For instance, a sum of £199,532 in excess of the amount authorised by the Treasury was expended by the Directorate of Inland Waterways and Docks during 1917-18. It is now stated that the further cost of these works, which after the 1st of April, 1918, became a charge against the Air Ministry, had by the 1st of November, 1918, amounted to £498,031, for which sum the covering sanction of the Treasury was asked in October last. That department has now asked the Air Ministry for an explanation of its action in thus expending a round half-million of public money beyond the amount sanctioned without any previous reference to it. That is the sort of thing which makes the unfortunate taxpayer despair of ever getting Government expenditure under control again. Every one of the Departments created by the War seemed to work on the principle of ignoring the Treasury until the money had been spent and then asking a tardy sanction after it was too late to recall the expenditure. We do not say that this specific sum was wrongfully spent. It may have been absolutely essential to the purposes of the War, but it most certainly ought not to have been spent without reference to the Treasury. The latter exists under Parliament for the express purpose of seeing that the moneys voted by the House of Commons, in peace or in war, are spent as wisely and well as a Government Department is capable of spending. It acts as a partial brake on the innate extravagance of the great spending Departments, and, if the latter are to have a free hand to spend whatever they like and to ask for approval afterwards, the Treasury, as a check, might just as well cease to exist. For that reason we trust that some one will get into serious trouble over this specific item in the accounts.

**Chaos  
 in the  
 Canteens**

Another administrative matter on which the Comptroller is very severe is in connection with the R.A.F. canteens. The surprising statement is made that practically no financial or other audit of canteen

accounts was done during 1918. Since then efforts have been made to ascertain the results of running the several canteens, and recoveries are to be made wherever possible under the terms of the several contracts. Incidentally, we fear there is very little hope of the Treasury being enriched by recoveries to be essayed at this late stage, especially when the conditions are realised. Two arrangements seem to have been entered into with a catering firm in the course of 1918. The first was to undertake the management of various canteens, and the second, made later, was for the firm to act as buying agents for all canteens under the Air Ministry. With regard to the former arrangements, a memorandum of agreement was drawn up but never signed, and it is proposed to effect a settlement on the basis of correspondence in October, 1919, which confirms the main points of the agreement. The Comptroller makes the caustic remark that "the procedure does not appear to be satisfactory, but pending settlement with the contractor any comment that may be necessary is reserved."

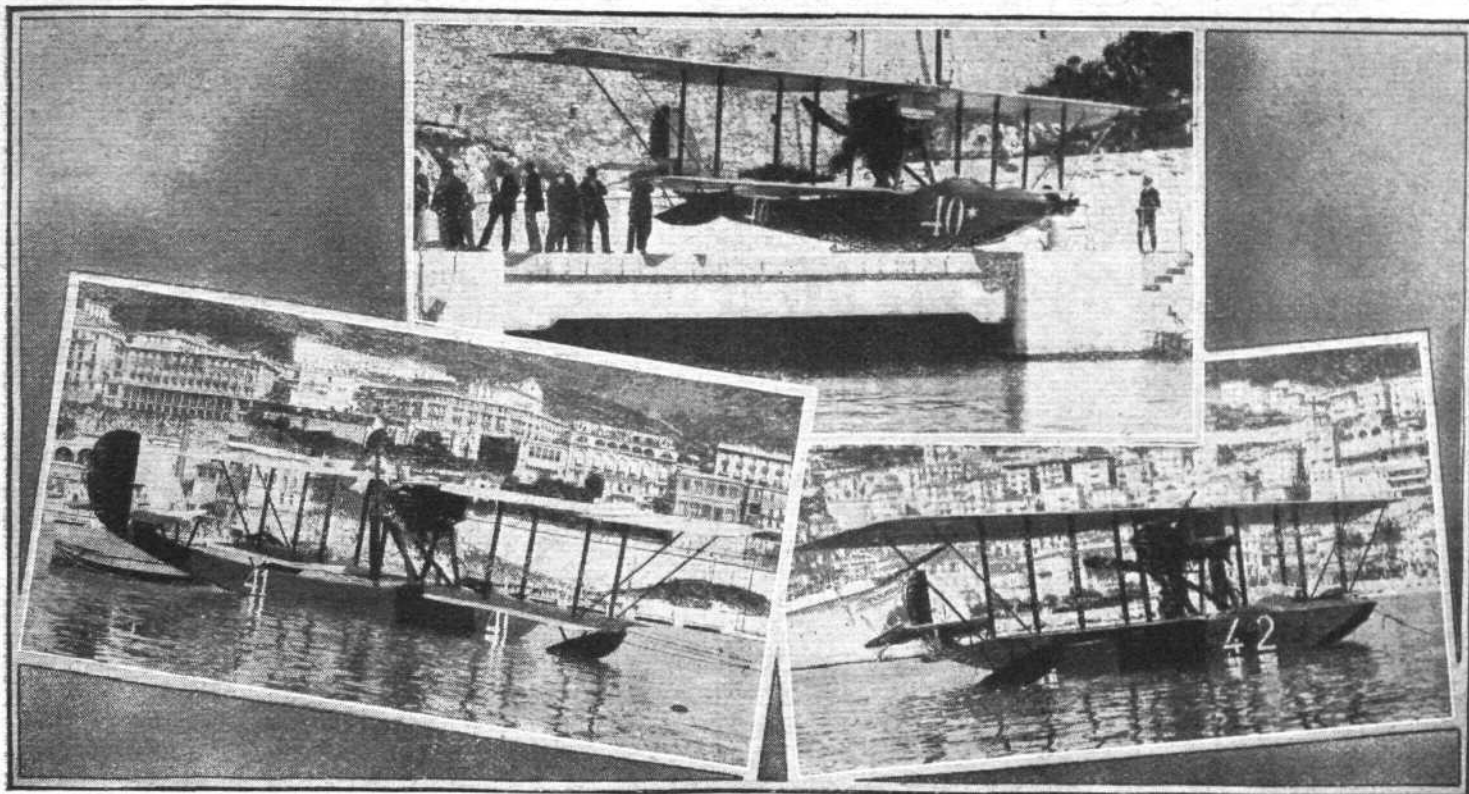
In connection with this matter the Air Ministry, in defence, points out that the canteens were in most cases run under circumstances of exceptional difficulty, in regard to pressure of time, location, fluctuations of numbers employed, &c., and, therefore, that the results may be expected to be less favourable than in the case of the munitions factories. "Although complete accounts have not been kept in all cases, the Ministry has no reason to suppose that serious irregularities have occurred." We are inclined to like the guileless faith in human nature displayed by the Air Ministry! However, all these things are of the past, the report being more in the nature of an inquest, and, as we have said, we are not inclined in the circumstances, to be too critical. It is to be hoped that the lessons have been properly learnt, and that the Air Ministry has by now placed its accountant branch on a sound and proper footing, and evolved a system under which none of these deplorable irregularities can occur in the future. What may easily be forgiven in the stress of war becomes quite unpardonable under peace conditions.

There is much more criticism by the Comptroller, but we refrain from pursuing the subject for the reasons we have given. The moneys involved have been spent, and are thus irrecoverable. Most, we agree, were spent to a good end, even if irregularly, and it is best now to let it pass.

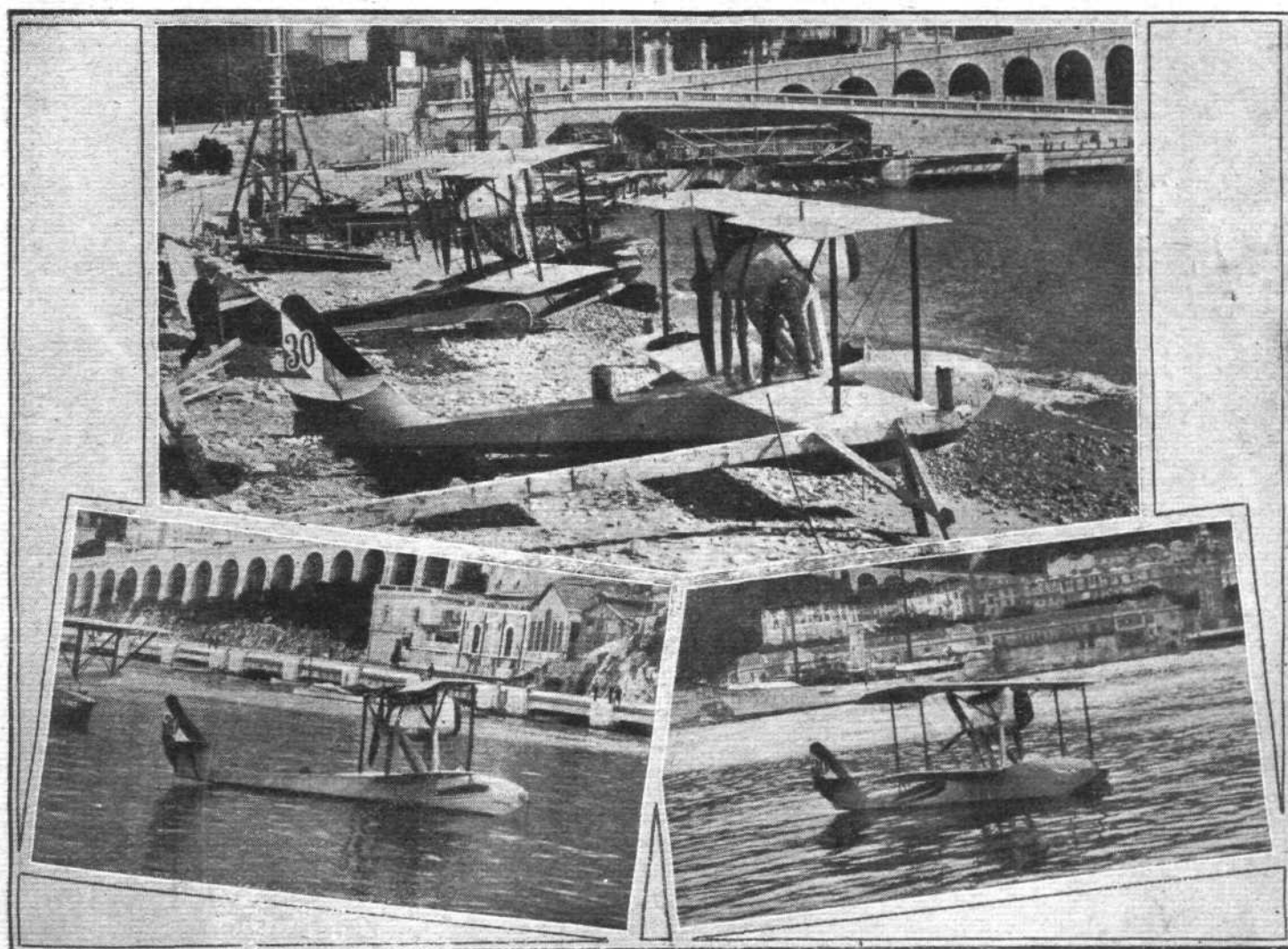
**State Aid  
 for  
 Aviation**

In his lecture last week before the Royal Aeronautical Society, Gen. Brancker discussed the best form to be taken by State assistance of civil flying. He said there were three alternative methods of affording such aid. These were guaranteed loads, a percentage on weight carried, and a subsidy rate per mile flown. The last, he said, was the simplest, and a suggestion on that line, based on speed and carrying capacity, had been put to the Air Ministry by the Society of British Aircraft Constructors. It had the effect of helping efficiency and inefficiency alike; but it was the form of subsidy most likely to encourage and increase flying generally. The second he dismissed, as it simply meant that the Government paid part of the cost of the load and so enabled aerial transport companies to carry for the public at lower rates than otherwise could be quoted. The first was the most limited, but also the least





Three of the G.L. flying-boats of the French Naval Air Service which were starting for Bizerta. The upper photo. shows No. 40, which was waterlogged, and was later broken up and taken away in bits by souvenir hunters, the engine being salvaged. The other two illustrations show Nos. 41 and 42, both of which started for Bizerta, No. 41, piloted by Bellot, being the only machine to make the double crossing "Flight" Copyright



AT MONACO : Three views of the splendid little Savoia racer flown by Janello in the speed race on Sunday, April 25

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repugnant, to the subsidy-hater. The Government guaranteed a minimum load of mails to a selected air service on an approved route. For example, a guaranteed ton a week at 5s. per lb. would be a god-send to the London-Paris service and would enable the Post Office to accelerate almost all ordinary correspondence.

For our own part, we are very much of the opinion that this is the form of State assistance which would be best calculated to encourage *bona fide* aerial enterprise. The main defect of the subsidy per mile flown is that it would quite possibly encourage the inauguration of air services on routes which cannot pay except by virtue of the subsidy. On the other hand, under the guaranteed load system, the contractor would make quite sure of his route and service before approaching the Post Office to enter into what is by way of being a partnership arrangement with him. No doubt the development of services would not be as rapid as under the other system, but it would have all the merits of probable permanency of service, which is what is wanted. Naturally we want to see development carried out as rapidly as possible, but we had rather see it develop healthily than in a hothouse atmosphere of subsidy, so to say. As we have so often urged, there must be State assistance, and the question to be decided is of the best form for that assistance to take. All things considered we are inclined to think that the guaranteed load system will be the best, initially at any rate.

#### A Career in the R.A.F.

The Air Ministry is acting with wise prevision in striving to make the R.A.F. a real career for boys and youths. In the past the fighting Services have been too much of a "dead end" occupa-

tion to attract the best class of young recruit. The Army, before the War, was a by-word in this. It took the young man of eighteen or twenty and at the end of his service with the colours threw him on the world with no trade in his hands and with the mark of "Reserve" against his name. As an avenue to useful employment it was worse than useless. The Navy was better, because at least it employed him for a period of twelve years after the age of eighteen, and taught him to be a useful member of society even if not a particularly skilled one. If he had manifested mechanical aptitude there were specialist branches in which he could qualify, and at the end of his service he could be worth good money in several directions.

The R.A.F. is going even better than that. As will be seen from the Air Ministry *communiqué*, which will be found elsewhere in this issue of FLIGHT, the scheme for the entry and training of boys is now in active operation. The basis of the scheme is that of co-operation between the R.A.F. and the local education authorities throughout the country. By this means it is ensured that none but the best and most desirable class of lad will secure entry to the Force, and that only after passing the entrance examination, which seems to be quite stiff enough to eliminate the dull and the casual. It is a thoroughly sound and commendable scheme, which ensures entry of the most suitable lads, and which trains them during their period of service to be highly-skilled craftsmen. teaches them habits of order and discipline, and turns them out on their return to civil life thoroughly trained, useful units with a far better and deeper knowledge of their trades than can possibly be acquired under the casual training of civilian workshops. We wish it all the success it deserves.

## THE INTERNATIONAL AIR CONVENTION

THE final text of the International Convention for the Regulation of Aerial Navigation was issued as a Parliamentary paper on Tuesday.

There are one or two alterations from the text as printed in FLIGHT of July 24, 1919, but a prefatory note to the present publication states that the differences between the final Convention and that of July, 1919, are due to revision by the General Drafting Committee of the Peace Conference. The majority of the alterations are changes of wording, mainly of an editorial character, and inserted from a legal standpoint.

There are, however, two substantial changes. Article 18 of the original Convention prevented any seizure or detention of an aircraft of one State when passing through the territory of another on the ground that the constitution or mechanism of the aircraft constituted any infringement of a patent, design, or model duly granted or registered in the State through which the aircraft was passing. Owing to reservations made by two Great Powers, it was necessary to amend this article to ensure an agreed text. A compromise was arrived at, the effect of which is to grant the State interested in the patent the right of detaining the aircraft, provided the aircraft is immediately released on the deposit of adequate security.

The following is the text of Article 18 as revised:—

"Every aircraft passing through the territory of a con-

tracting State, including landing and stoppages reasonably necessary for the purpose of such transit, shall be exempt from any seizure on the ground of infringement of patent design, or model, subject to the deposit of security the amount of which in default of amicable agreement shall be fixed with the least possible delay by the competent authority of the place of seizure."

The second alteration of principle was the entire deletion of Article 23 of the original text, which defined the legal position of an aircraft and the legal relations of persons on board that aircraft while engaged in an inter-State flight. Objections were made by some Powers on the ground that the doctrine of territorial sovereignty asserted in Article 1 of the Convention was sufficiently broad to cover all the questions dealt with in Article 23, and therefore that Article 23 was unnecessary. The Article was consequently removed from the Convention altogether.

The following States are the parties to the Convention:—United States of America, Belgium, Bolivia, Brazil, the British Empire, China, Cuba, Ecuador, France, Greece, Guatemala, Haiti, the Hedjaz, Honduras, Italy, Japan, Liberia, Nicaragua, Panama, Peru, Poland, Portugal, Roumania, the Serb-Croat-Slovene State, Siam, Czechoslovakia, and Uruguay.

#### The Turnhouse Aerodrome

WHEN the Edinburgh Corporation Bill came before a Committee of the House of Lords, presided over by Lord Ritchie of Dundee, on May 3, it was explained that the intention of the clause (to enable the corporation to take over the Turnhouse Aerodrome), was to allow a lessee to take over the aerodrome. On the Committee asking for evidence on this point, Wing-Commander Beatty, Deputy Controller of the Department of Civil Aviation of the Air Ministry, attended and stated that Turnhouse Aerodrome was one which the Government had decided to dispose of, but they informed Edinburgh Corporation that it would be in the interest of the locality to maintain an air station there. A conference had

taken place between the Air Ministry and the Corporation of Edinburgh, at which the former informed the Corporation that it was part of the policy of the Ministry to encourage large municipalities to interest themselves in the subject, and, if necessary, to promote legislation on the subject. The Ministry approved of the insertion in the Bill of a clause authorising the Corporation to acquire the Turnhouse site, and to use it as an aerodrome either by themselves or by lessees.

After a consideration in private, the Chairman announced that the Committee considered that this was a matter which should be the subject of general legislation, and they were not prepared to create a precedent by agreeing to the clause.





BY THE TECHNICAL EDITOR

Monday, April 26

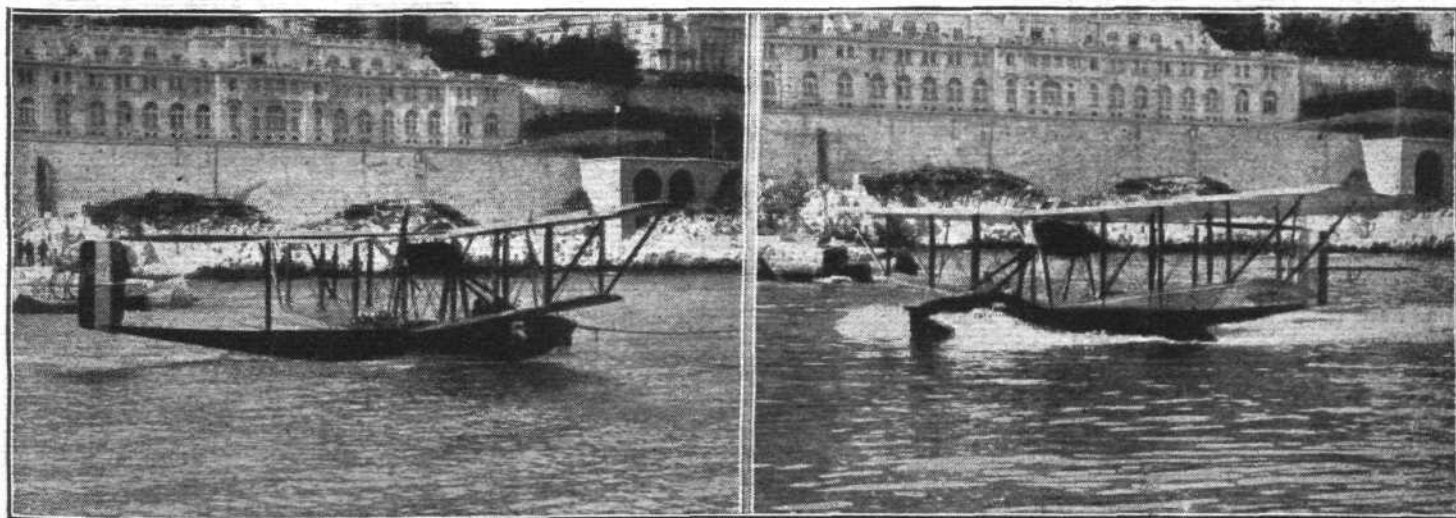
CONCERNING yesterday's speed race it was possible to get through in time for last week's issue of *FLIGHT* very brief particulars only, giving the bare results of the race. It is, therefore, now proposed to deal with the happenings of the day in somewhat greater detail. As recorded in last week's issue, the famous Italian pilot, Janello, whose excellent flying at Bournemouth on the day of the Schneider Cup contest last year will still be remembered, arrived on Saturday, April 24, on one of the standard Savoia S. 13 flying-boats. During the evening he went back to Vintimiglia to fetch the Savoia racer, the S. 17, about whose speed all sorts of rumours were afloat. Actually, Signor Janello informs me, her speed is about 265 km. per hour (about 160 m.p.h.) which, while being less than that with which rumour credited the machine is certainly an excellent performance for a machine of the flying-boat type.

Yesterday morning, just after 6 o'clock, three of the French Naval Air Service flying-boats were cruising about outside the harbour trying to get "unstuck." The sea was as calm as a mill-pond, and there did not appear to be a breath of wind, while a slight morning haze obscured the horizon. After vainly attempting to get the machines off the task was given up as hopeless, and the machines returned to port. After being relieved of some of their load of petrol another attempt was made about 9 o'clock, and this time the machines managed to get away. One of them, however, returns to port, the boat apparently leaking badly. This is No. 40;

shown in one of the accompanying photographs, which was piloted by Lieut. Guierre, accompanied by 1st Master le Duff. This machine is moored to one of the buoys in the north-east corner of the harbour and is sinking rapidly, being later hoisted up on the North quay just in time before foundering. The other two boats, Nos. 41 and 42, are later announced as having reached Ajaccio. The Tellier-Sunbeam, No. 47, piloted by Hurel, which also started yesterday morning, about 7, also reached Ajaccio, taking 2½ hours for the journey. Leaving Ajaccio at 11 for Bizerta No. 47 had engine trouble, and had to come down at San Antioco, a small island off Sardinia.

The three-engined Caudron, piloted by Maïcon, came out Sunday morning about 11 to go for his altitude test (2,000 m. in less than 45 mins.) before leaving for Corsica and Bizerta. The sea was calm and there was little wind, and the machine appeared to be very much under-powered. The two floats appeared to bury their heels and sent up volumes of water, but of planing there was no sign. To the onlookers it looked as if it was not possible to get the tail up for gathering speed, and the power was not sufficient to pull the machine off, tail down, as may be done with a light machine and a high-powered engine. After cruising around for some time Maïcon gave up the attempt, and returned to his moorings in the harbour.

About this time de Romanet, in the racing Spad, went out for a trial flight and passed his altitude elimination test in good style, the machine getting off and alighting extremely



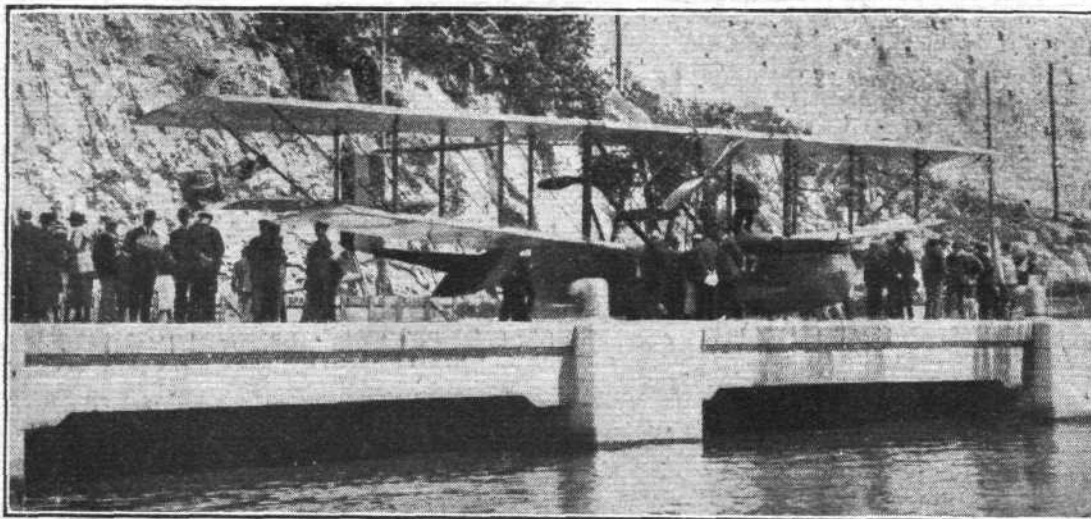
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TWO VIEWS OF THE TELLIER-NIEUPORT-SUNBEAM BOAT PILOTED BY M. LECOINTE: The photo, on the right shows the machine coming in after passing its altitude test



The Tellier-Hispano boat, piloted by Hurel, which is taking part in the flight to Tunis. This machine has two Hispano engines, one driving a tractor and one a pusher. In other respects it is similar to Lecoq's machine

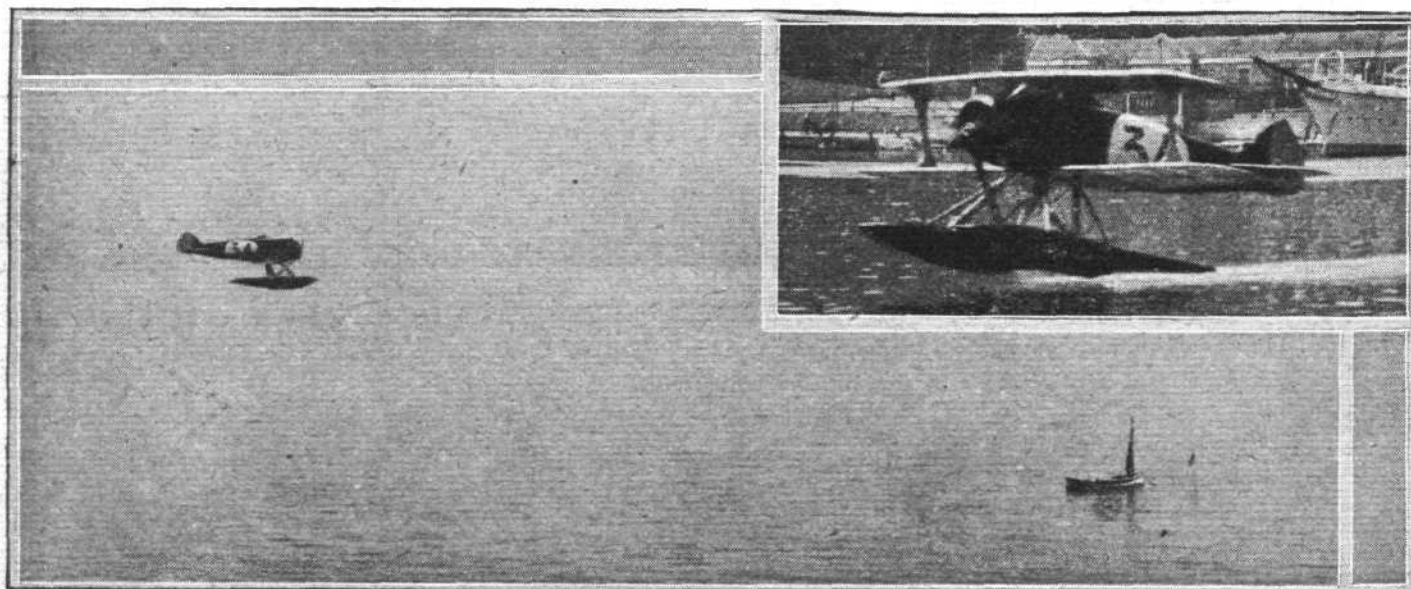
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well, even when fitted with the small racing wings. Shortly after 11 o'clock a black speck was seen in the sky in the direction of Cape Martin. From the speed at which it approached we guessed it to be the racing Savoia, piloted by Janello, arriving from Vintimiglia. This proved to be correct and, coming in at a terrific pace, the Savoia shot between the two lighthouses at the mouth of the harbour. To most of the spectators, and certainly to the writer, it appeared absolutely impossible for Janello to pull up in time before reaching the houses on the Condamine. The first splash indicating contact between the water and the step of the boat was not seen until the machine was quite half-way into the little harbour, and at the speed at which the Savoia was going one simply gasped at the thought of what would happen. However, after once having touched, the machine pulled up very quickly and, with the exception of lightly touching a buoy with her lower plane when the speed was down to about 5 or 6 m.p.h., Janello beached her at the inner end of the harbour without incident. This alighting was one of the finest bits of piloting one has seen for a long time, and serves to show what an excellent pilot is Signor Janello. As one who had watched the performance of the other machines very closely for the past week or ten days, the writer felt convinced that, barring accidents, the speed race would go to Janello, the Savoia being obviously miles faster than the Spad, even after racing wings had been fitted to that machine. About an hour after his alighting Janello took up the racing Savoia for its altitude test which he found no difficulty in far surpassing. During the day a number of flying-boats belonging to the Naval Air Service came over from St. Raphael to see the speed race.

About an hour before the start of the speed race an airship

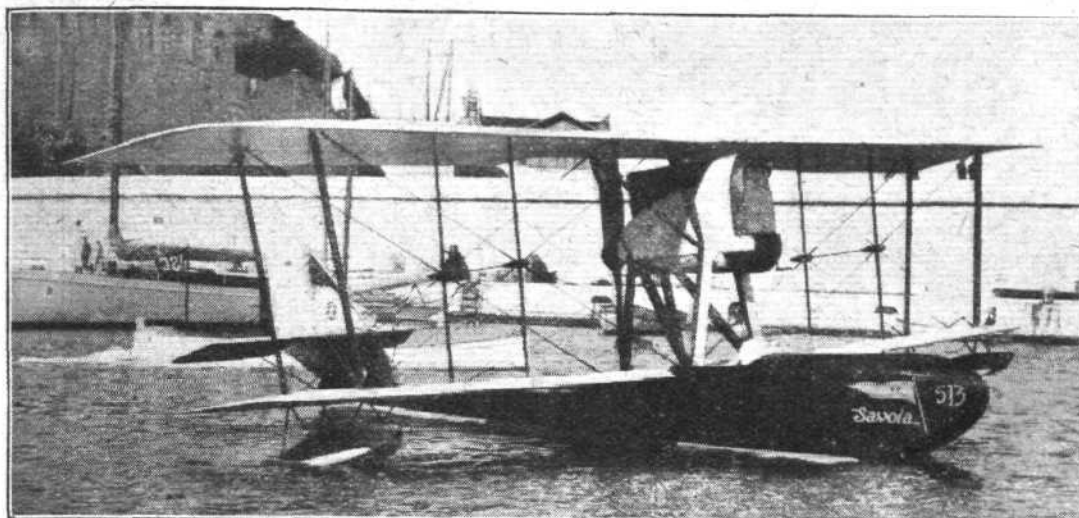
was seen approaching from the direction of St. Raphael. This proves to be an Astra Torres (A.T. 9) which has cruised over from Toulon. She passes over the Tir aux Pigeons and cruises towards Mentone, returning shortly afterwards, and after a few evolutions points her nose towards Toulon and disappears behind the Monaco Rock. Towards three o'clock every point of vantage in the Principality appears to be black with people who are eager to see the speed race. The Tir aux Pigeons is the scene of a distinguished gathering, looking towards the harbour mouth whence will come, on the firing of the usual signal, the three machines entered for the speed contest. The first to get away is de Romanet on the Spad, who makes a very clean get-away and immediately heads for Cape Martin, the first turning-point. He is seen to round the mark boat outside the cape and is soon coming back towards Monaco. Here he passes over the mark boat outside the Tir aux Pigeons and disappears behind Fort Antoine on his way to the Garoupe lighthouse which is the far turning-point of the course. The gun goes for Janello, who at that moment is cruising about in the harbour with his machine facing into the harbour. A little time is lost in getting the machine into position for the take-off, but in a few seconds the Savoia comes hurtling out of the harbour mouth and makes for Cape Martin. In coming back from there one notices that Janello takes his turns around the mark boat wide, very much wider than did de Romanet. The third machine, piloted by Tece, is the last to start and no sooner is he in the air than it becomes evident that his engine is running badly. Tece cruises around for a few minutes in the hope, evidently, of the engine picking-up, but matters seem to go from bad to worse and he has to give up and return to port. This leaves only de Romanet and Janello in the



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AT MONACO : de Romanet, on the Spad, winning the speed race. Inset : The machine getting off at the start of the race





A very excellent flying boat: The standard Savoia S. 13 on which Janello gave some wonderful exhibitions of trick flying, including looping, spinning, rolls, Immelman turns, side-slips, etc.

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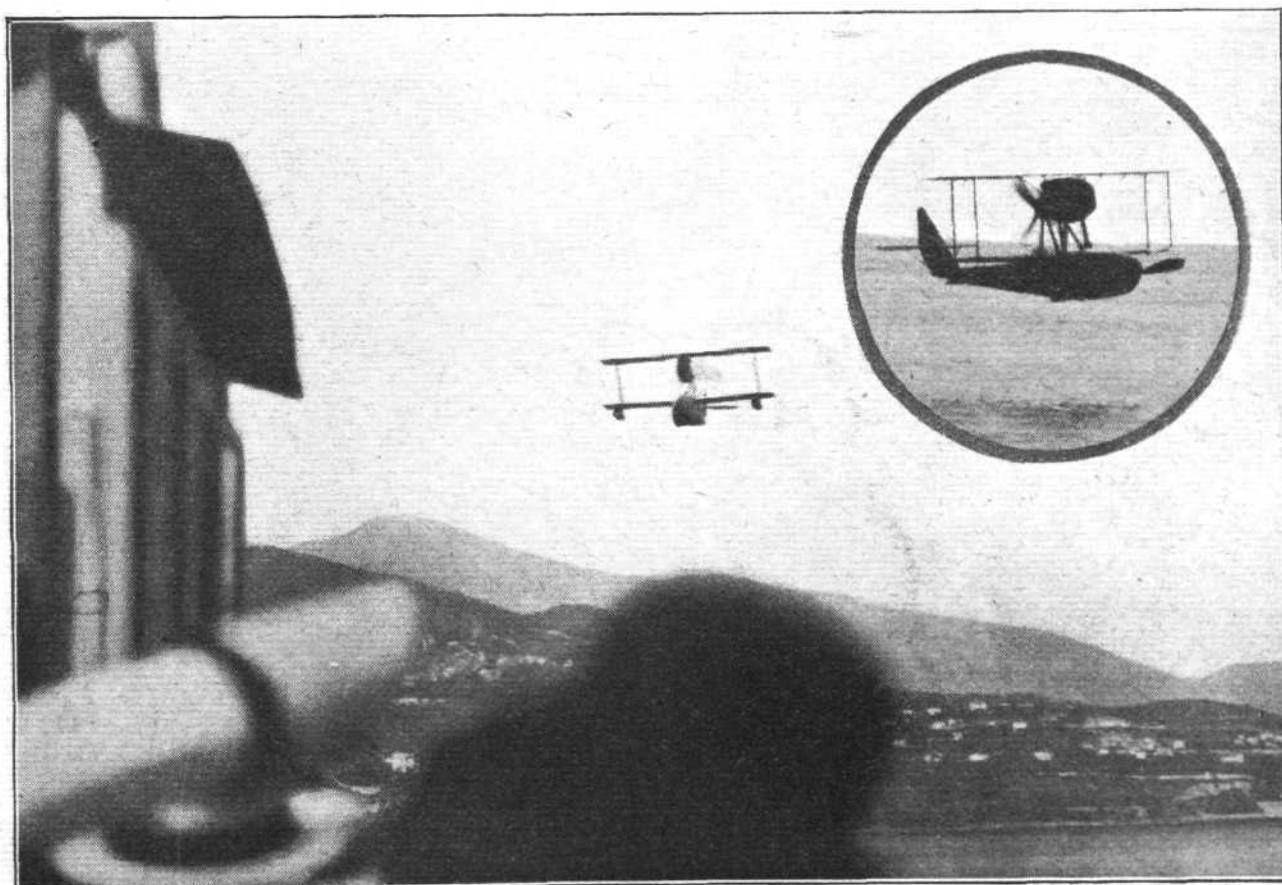
race. The general opinion is that the Savoia is the faster of the two machines, but it is feared that if Janello does not cut his corners finer he may lose the race.

The Spad comes into view going towards Cape Martin and having rounded makes for home. He passes the finishing line between the Tir aux Pigeons and the mark boat, as shown in one of our photographs. Shortly afterwards, Janello is seen heading for Cape Martin, and in a few minutes he approaches, flying low over the Tir aux Pigeons, giving the crowds assembled there a splendid idea of the speed of his machine. In a few minutes the times are announced, M. de Romanet, on the Spad, being the winner, his time being 22 mins. 32½ secs. Janello's time is given as 23 mins. 29½ secs. There can be no possible doubt that, had Janello not lost time at the start and taken his corners wide, he would have won the race. However, de Romanet made up for the slightly lower speed of his Spad by excellent piloting and no one grudges him his victory.

Shortly after the finish of the speed race the three-engined Caudron comes out of the harbour, piloted by Maicon. He

intends to have another try for the altitude elimination trial. This time he is more successful, a slight breeze helping him to get into the air, assisted by a few gentle bumps from the slight swell that is now running. The floats are not required to do much planing and a final wave bumps the machine off. Once in the air she climbs fairly well and is soon lost to sight. In the meantime Janello boards the Savoia two-seater and goes up to give a demonstration of stunt flying.

Every trick of which a land machine is capable is performed, apparently, with equal facility by Janello on the Savoia flying-boat. Spins, rolls, sideslips, dead-leaf falls and loops are all shown, the loop being somewhat reminiscent of those which a quaint little machine affectionately known as "Lizzie" used to perform at Hendon some years ago. The machine gets to the top of the loop, appears to hang there for some little time, thinking matters over, and then, suddenly, flops into a right-way-up position. The Savoia, however, appears to drop considerably while in the inverted position. One of these loops was followed by a vertical dive during which the machine gained such a speed that one expected to see



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AT MONACO: Janello, on the Savoia racer, coming in over the Tir aux Pigeons at the finish of the race.  
Inset: The Savoia racer alighting





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**A STRONG COMBINATION :** Left : M. Casale, the Spad pilot. Centre : M. Herbemont, the designer. Right : M. L. Blériot, the constructor of the famous Spad machines

the wings fold up when flattening out. However, this did not happen, which speaks volumes for the strength of the Savoia construction. On alighting, Janello was greeted by an enthusiastic crowd which gathered around the machine where she "sat" on the beach, and small wonder. Even



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**THE NIEUPORT CREW :** On the left M. Sadi Lecointe, and on the right Capt. Coll, his navigator. Photo. taken just before their departure for Tunis

those of us who have been connected with aviation since its earliest days marvelled at the performance.

In the meantime the Caudron has alighted, coming in from the mountains at the back of the harbour and missing the hotels along the Condamine by inches. Before the machine has reached the harbour mouth it has touched and is soon



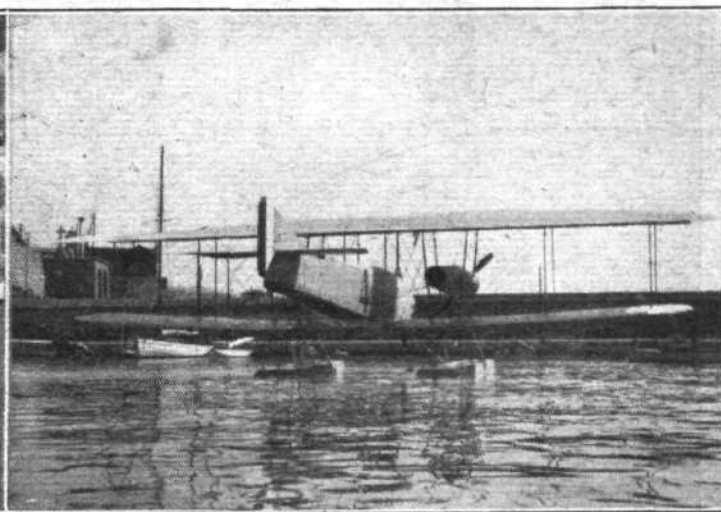
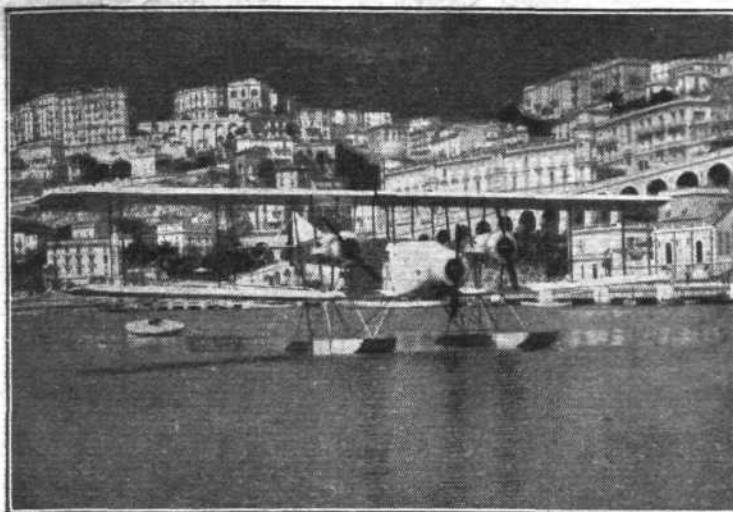
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**THE TWO SPAD PILOTS :** On the left M. de Romanet, who won the speed race on Sunday, April 25, and on the right M. Casale, who has been going for altitude records on the Spad



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**THE ITALIAN CONTINGENT :** Signor Janello (left), whose flying on the Savoia machines has been greatly appreciated at Monaco, and his mechanic



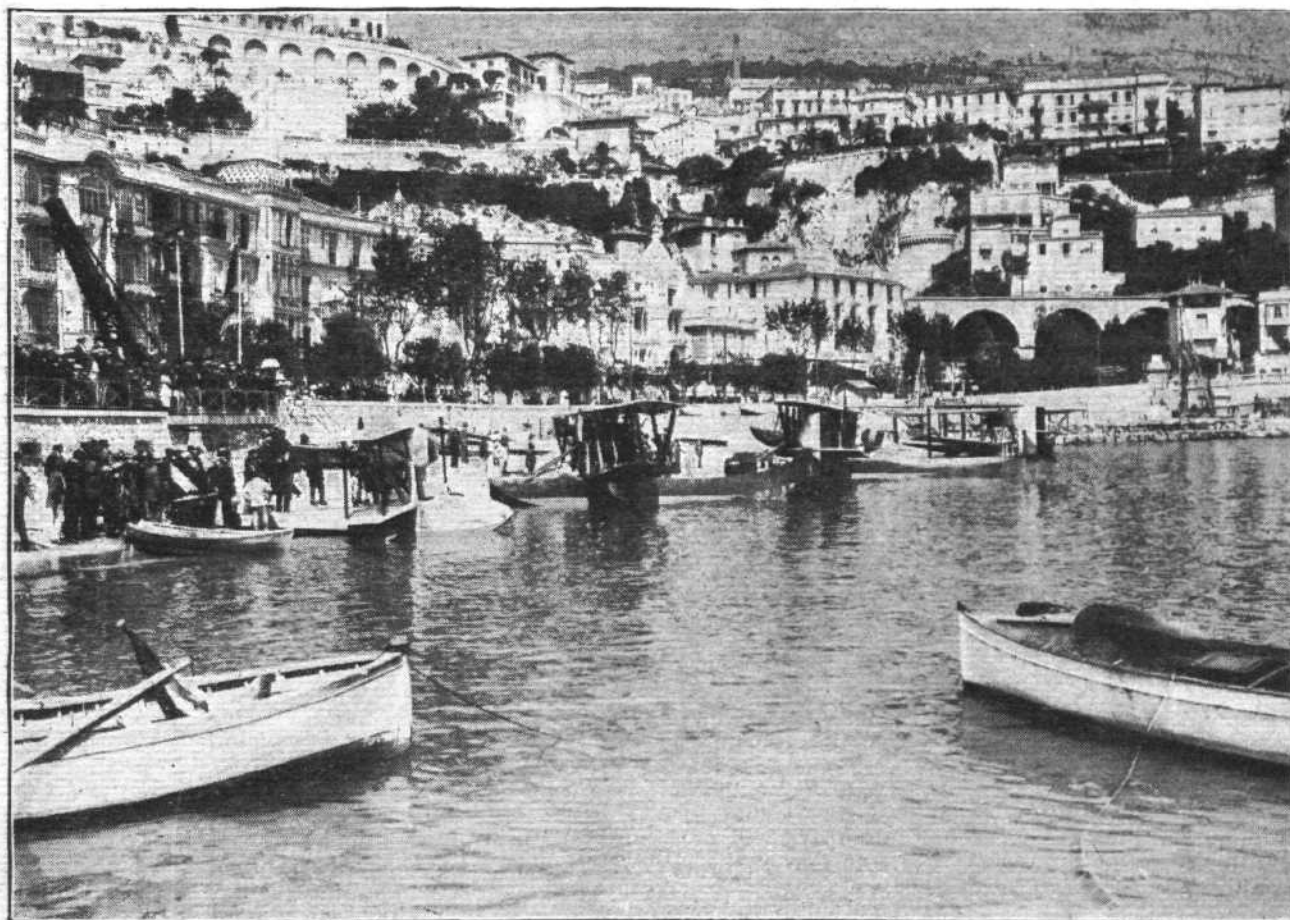
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**THE THREE-ENGINE (CLERGET) CAUDRON PILOTED BY MAÏCON:** This machine had to retire for repairs to her floats, which were leaking badly

back at its moorings, having passed its altitude test. It is not, however, destined to make the flight to Bizerta, for it is found that both floats are leaking and, on being hoisted on to the North quay, the floats show a cracked side just in front of the step, both floats having sustained exactly the same damage. This would indicate faulty step design and construction, and this morning the machine was dropped into the sea again, with a much lighter load, and getting off very well, made for St. Raphael where, one gathers, it is hoped to be able to effect repairs.

Apart from the naval flying-boats, which are making the flight *hors de concours*, there is now only Lecoigne's Tellier-Nieuport-Sunbeam machine in the Grand Prix race. It is hoped that two Savoias, S. 12 and S. 12 bis, with 480 h.p.

San Giorgio engines, will arrive during the next couple of days. One of these will be piloted by Janello and the other by Maddalena. In a general way these two machines, I am informed by M. Santoni, managing director of the Savoia firm, and well-known in this country from his association with the British Deperdussin Co., resemble the other Savoias, but they are much larger than both the S. 13, and, of course, the little racer, which latter also has a San Giorgio engine, but of 300 h.p. One of the features of all Savoia flying-boats is the peculiar shape of the hull bottom in front of the step. Instead of a Vee bottom, as is the usual shape at this point, the Savoias have a concave bottom in front of the step. The result appears to be that these machines give practically no wake after them. At low speeds they



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**AT MONACO:** A row of flying boats in the harbour. Reading from left to right the machines are: Racing Savoia, T. 157 Hispano, H. 13 Sunbeam, F.B.A., and H. 15 Sunbeam





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A standard Spad, piloted by Ensign Tece, which was to have taken part in the speed race, but was prevented by engine trouble

appear to pile up the water in front of the nose, but as soon as a certain speed is reached this bow wave seems to die down gradually, and the boats get off with practically none of the flying spray which one associates with all flying-boats. There is not the slightest doubt that on a calm sea, at any rate, this design is excellent. What its behaviour would be in a rough sea I have no means of knowing, but there is no reason to suppose that a moderate sea would change their behaviour, and in a very rough sea no seaplane will get off in any case, so on balance the design would appear to be not without merits.

Tuesday, April 27.

Yesterday was a blank as far as flying was concerned. The only event was the departure of the three-engined Caudron, which was taken by some to be a start for Ajaccio, but which was, in fact, the good-bye to Monaco and all hopes of sharing any part of the Grand Prix prizes, the machine making for St. Raphael in order there to discard its "slippers" which had surely caused metaphorical corns and blisters, for a set of wheels before returning to Paris by air. As a

## No Air Mail on May Day

THE Postmaster-General announced on April 30 that no air mail would be dispatched from London to Paris or from Paris to London on Saturday, May 1.

## New Air Screw

A PUBLIC demonstration is to be made shortly of a new type of air screw, the invention of an Australian engineer, states *The Times*. It is made on the turbine principle, both faces of the blades being fitted with a set of fins in staggered relation. Workshop tests have shown that for a given number of revolutions per minute the air speed produced by this propeller is, in comparison with that produced by the ordinary type, as five to three.

It is claimed that the turbine fins can be fitted to ordinary propellers by a simple metal attachment. The fins have the effect of giving the necessary extra strength required to act against any increase of lever-action on the leading edge of the blade.

land machine, it is quite possible that this three-engined Caudron is a very serviceable 'bus, but as a seaplane, to carry more than the lightest of loads, it must be deemed a failure. If structural considerations would allow of three higher-powered engines being fitted the machine might develop a performance, but not as it stands at present.

As far as concerns the Grand Prix the situation appears to be unaltered. The Tellier-Hispano, piloted by Hurel, is still at Cagliari effecting repairs. The G.L. boats Nos. 41 and 42, piloted respectively by Bellot and Maurecourt, got away from Ajaccio at 8 this morning, but had to return after meeting fog. Lecointe is still waiting at Bizerta for a new propeller. The two Savoias and the two Nieuport-Macchi machines are expected to arrive from Lake Maggiore either this evening or tomorrow morning, but if their arrival is much delayed they will have little time to spare for their altitude elimination trials and the double crossing of the Mediterranean.

Later information to hand indicates that on Wednesday, April 28, the two naval flying-boats, No. 45 pilot Sala, and No. 46, pilot Renaud, left Monaco for Ajaccio at 7 and arrived there at 10. After replenishing they left again about noon. Helped by a north-east wind they made the Straits of Bonifacio by 3 o'clock, flying over the straits and crossing to the eastern side of Sardinia. Bellot and Maurecourt, flying No. 41 and 42 respectively, left Ajaccio at 8, passed Cape Carbonara at 11, and arrived at Bizerta at 3 in the afternoon of April 28, having made the crossing without any trouble or incident. The two Savoias, piloted by Janello and Maddelena, arrived at Monaco and the Nieuport-Macchi, piloted by Zanetti and Brigante, at Villefranche on the same date. Before being allowed to enter for the Grand Prix these machines will have to pass their altitude tests with full load.

On Thursday, April 29, the following happenings are recorded: Bellot and Maurecourt (Nos. 41 and 42) made the Bizerta-Tunis, Sousa, Bizerta flight. Sala (No. 45) and Renaud (No. 46) have arrived at Cagliari and Cape Ferro-Cavallo respectively. Janello makes his altitude test, reaching the stipulated height of 2,200 m. in 13 mins, 20 secs.

Friday, April 30.—Hurel (No. 47) arrives at Bizerta at 7.30 in the evening. The English steamer, *Cyclope*, picks up Renaud (No. 46) in latitude 37° 10', longitude 10° 21', and takes him to Algiers. Lecointe has engine trouble on attempting to start from Bizerta, and has to abandon all hope of flying back to Monaco within the time limit set for the Grand Prix. Sala is at Cagliari with No. 45 and Nos. 41 and 42 (Bellot and Maurecourt) are waiting at Bizerta and Sousa respectively.

Sunday, May 2, was the closing day for the seaplane contests and the date for the second speed race. The latter was contested by three entrants: Zanetti (Nieuport-Macchi), de Romanet (Spad-Herbement), and Morselli (Nieuport-Macchi), Zanetti being the winner. On alighting after the race his machine turned over in the harbour, the pilot sustaining slight injuries and the machine being badly damaged. About 4.15 No. 41, piloted by Bellot, was seen approaching Monaco, having crossed the Mediterranean during the day, leaving Bizerta at 7.40 a.m., arriving at Ajaccio at 12.35. On alighting Bellot was given an enthusiastic reception, and well he deserved it, being the only pilot to succeed in making the entire journey. As he is flying *hors de concours* he will not receive any monetary reward. Lecointe has been awarded the second prize (50,000 francs) for his performance in the race.

## Wireless Eavesdropping

DEMONSTRATING the working of a portable set of wireless telephone receivers at the last of the season's series of lectures organised by the Overseas Club, at the Club's premises in General Buildings, Aldwych, Mr. Finucane was able to let the audience overhear the pilot of a London-Paris aeroplane speaking to the aerodrome at Waddon, Croydon. He was asking for landing directions, and the reply from the aerodrome was also heard.

## Wireless Operators Wanted for the R.A.F.

THE Royal Air Force is open to accept a limited number of young men between the ages of 18 and 23 for training as wireless operators. They must, of course, be of good education and address, and will receive pay at the rate of 3s. per day, free uniform and usual allowances, whilst undergoing training.

It is stated that there is splendid scope for advancement for men who qualify well—the pay rising to 18s. per day, according to rank.

# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## RACING COMMITTEE

MEETINGS of the Racing Committee were held on Tuesday, April 20, and Wednesday, April 28, 1920, when there were present:—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. G. B. Cockburn, and the Secretary and several Members of the Technical Committee by invitation.

It was decided to form a class to be known as the 10-Rater Class for aeroplanes conforming to the following conditions:—Flying weight not to exceed 1,000 lbs., inclusive of pilot and fuel for a flight of 150 air-miles, and under these conditions capable of flying at a minimum speed not exceeding 40 m.p.h. and of looping the loop.

The question of handicapping for Aeroplane Races was discussed.

## JOINT STANDING COMMITTEE OF THE ROYAL AERO CLUB AND THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

A Meeting of the Joint Standing Committee of the Royal Aero Club and Society of British Aircraft Constructors was held on Wednesday, April 21, 1920, when there were present:—

Royal Aero Club—

Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., in the Chair.

Squadron-Leader T. O'B. Hubbard, M.C., R.A.F.

Lieut.-Col. Alec Ogilvie.

Harold E. Perrin, Secretary (Royal Aero Club).

Society of British Aircraft Constructors—

Capt. P. D. Acland.

Mr. R. O. Cary.

Mr. Hamilton Fulton.

Charles V. Allen, Secretary (Society of British Aircraft Constructors).

The following subjects were discussed:—

Deutsche de la Meurthe Cup.

Certificates of Airworthiness for machines taking part in speed competitions.

Aerodrome and Direction Book for Touring Purposes.

Classification of Racing Machines.

## HOUSE COMMITTEE

A Meeting of the House Committee was held on Monday, April 26, 1920, when there were present:—Mr. Ernest C. Bucknall, in the Chair, Maj. H. Graeme Anderson, Mr. Herbert J. Corin, Mr. C. G. Greenhill, Mr. Henry Knox, Lieut.-Col. F. K. McClean, Mr. J. Stewart Mallam and the Secretary.

**Election of Chairman.**—On the motion of Mr. Henry Knox, seconded by Mr. Herbert J. Corin, Mr. Ernest C. Bucknall was unanimously elected Chairman of the Committee for the current year.

## COMMITTEE MEETING

A Meeting of The Committee was held on Wednesday, April 28, 1920, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Maj.-Gen. Sir Sefton Brancker, K.C.B., Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Lieut.-Col. Spenser D. A. Grey, D.S.O., Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. F. K.

McClean, Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., Lieut.-Col. Alec Ogilvie, Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., Sir Mortimer Singer, K.B.E., J.P., and the Secretary.

**Election of Members.**—The following New Members were elected:—

Capt. Albert Lawson Cuffe (late R.A.F.).

Capt. Lessel Finer Hutcheon (late R.A.F.).

**"Daily Express" £10,000 Prize.**—The following entries for the *Daily Express* £10,000 Prize were reported:—Reginald Watson Kenworthy and Proprietors of *Yorkshire Evening News*, Leeds.

Particulars of Aircraft: Blackburn Kangaroo, fitted with two Rolls-Royce Falcon engines, 250 h.p. each.

Maj. A. S. C. Stuart-MacLaren, O.B.E., M.C., A.F.C.

Particulars of Aircraft:—Handley Page, fitted with two Napier "Lion" engines, 450 h.p. each.

**Stewards of the Club.**—The Stewards of the Club for the year 1920 are as follows:—

The Earl of Lonsdale.

Admiral of the Fleet the Rt. Hon. Sir Edward Seymour, G.C.B., O.M., G.C.V.O.

The Hon. Sir Arthur Stanley, M.V.O., M.P.

The Rt. Hon. Lord Hugh Cecil, M.P.

Sir David Salomons, Bart.

Lieut.-Gen. Sir David Henderson, K.C.B., D.S.O.

**Death of Professor A. K. Huntington.**—On the motion of the Chairman, seconded by Maj.-Gen. Sir Sefton Brancker, K.C.B., the following Resolution was unanimously passed:—

"Resolved that the Committee of the Royal Aero Club desires to place on record its deep regret at the death of Professor A. K. Huntington, a Member of the Council, who had been a Member of the Club since its foundation in 1901 and had served on the Committee for many years, and at the same time to express its high appreciation of the valuable services he had rendered to the Club and to Aeronautics."

The Chairman was requested to forward a copy of the Resolution to the relatives.

**Racing Committee.**—The reports of the Meetings of the Racing Committee held on April 20 and 28, 1920, were received and adopted.

**Joint Standing Committee of the Royal Aero Club and the Society of British Aircraft Constructors.**—The report of the Meeting of the Joint Standing Committee of the Royal Aero Club and the Society of British Aircraft Constructors held on April 21, 1920, was received, and adopted.

**House Committee.**—The report of the Meeting of the House Committee held on April 26, 1920, was received and adopted.

**Aerodrome and Direction Book for Touring Purposes.**—The list of hotels and garages provisionally recommended by the Royal Aero Club for insertion in the Aerodrome and Direction Book to be issued by the Air Ministry was approved.

**Gordon Bennett Aviation Cup and Jacques Schneider Cup, 1920.**—It was decided to extend the date for receiving British entries for the Gordon Bennett Aviation Cup and the Jacques Schneider Cup, 1920, to Thursday, July 15, 1920.

Offices: THE ROYAL AERO CLUB,  
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

## How We Destroyed the Zepps.

At the "farewell" speech to his late colleagues, after being presented with a silver tray, at the Ministry of Munitions, Mr. F. G. Kellaway said that when the German Zeppelins were being brought down, the Germans could not understand how it was being done. A leading official of the Ministry thereupon told them. He called in draughtsmen and others and prepared plans and information about "the new method of smashing Zeppelins with liquid fire." This was got over into Germany and sold to the German Secret Intelligence for £14,000.

## Mr. Ford to Make Aircraft

As our readers know, Mr. Henry Ford has again been giving his consideration to the question of constructing air-

craft, and word now comes from New York that the Ford Motor Co. and the firm of Henry Ford and Son, the tractor branch, will be consolidated and reorganised with a capital of £20,000,000, to allow for this aircraft development. This represents an increase in the capital stock of the joint companies from £600,000, and it is understood that the entire stock of the new organisation will be held by Mr. Ford, his wife, and son. Formal notice of the reorganisation has been filed with the Secretary of State of Michigan, although the incorporation will be under the laws of the State of Delaware, which will permit greater latitude in operations than Michigan. The new concern will also embark on the manufacture of internal combustion locomotives and petroleum-driven tramway cars.



## FUTURE OF THE AERONAUTICAL RESEARCH COMMITTEE

THE Secretary of the Air Ministry communicates the following information as to future arrangements for aeronautical research and education. The whole question was considered by the Committee under the chairmanship of Sir Richard Glazebrook, K.C.B., F.R.S., appointed by the late Secretary of State for Air, Lord Weir of Eastwood. The report of this Committee has already been published.

The Committee recommend, *inter alia*, that (1) the present Advisory Committee on Aeronautics should be replaced by an Aeronautical Research Committee in connection with the Air Ministry, performing functions different from those of the Advisory Committee, including certain executive functions, and (2) that a Department of Aeronautics should be established at the Imperial College of Science under the directorship of the Zaharoff Professor of Aviation for the provision of advanced instruction in aeronautics.

The Aeronautical Research Committee has now been constituted with the following terms of reference:—

(1) To advise on scientific and technical problems relating to the construction and navigation of aircraft.

(2) To undertake and supervise such research or experimental work as is proposed to the Committee by the Air Ministry, and to invite any research work which the Committee considers to be advisable; to carry out such work itself or to recommend by whom the work should be carried out;

(3) To take over complete responsibility for the Air Inventions Committee and for the Accidents Committee.

(4) To promote education in aeronautics by co-operating with the Governors of the Imperial College;

(5) To assist the aeronautical industry of the country by scientific advice and research, and to co-operate with any research association that may be established;

(6) To prepare for the approval of the Air Council a scheme of work and estimate of expenditure for the year, and to administer the funds placed at its disposal by the Air Council.

(7) To make reports from time to time to the Air Council.

The members of the Committee are as follows:—

Chairman: Professor Sir Richard Glazebrook, K.C.B., F.R.S., University of London, Zaharoff Professor and Director of Aviation in the Imperial College of Science and Technology; two representatives of the Department of Civil Aviation in the Air Ministry, namely, Wing-Commander W. D. Beatty, C.B.E., A.F.C., and Lieut.-Col. E. Gold, D.S.O., F.R.S. (the latter for Meteorology); two representatives of the Department of Supply and Research in the Air Ministry, namely, Air-Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., Director of Research, and Wing-Commander T. R. Cave-Brown-Cave, C.B.E. (the latter for Airships); two representatives of the Imperial College of Science and Technology, namely, the Zaharoff Professor (Chairman of the Committee) and Professor L. Bairstow, C.B.E., F.R.S., the Professor of Aerodynamics; Professor

Sir J. E. Petavel, K.B.E., D.Sc., F.R.S., Director of the National Physical Laboratory, representing the Department of Scientific and Industrial Research; Mr. Alec Ogilvie, C.B.E., representing the Royal Aeronautical Society; Mr. H. White Smith, C.B.E., and Mr. J. D. Siddeley, C.B.E., representing the Society of British Aircraft Constructors.

With the following scientific representatives:—Professor Horace Lamb, M.A., D.Sc., F.R.S., Professor of Mathematics in the University of Manchester; Professor W. E. Dalby, M.A., D.Sc., F.R.S., Professor of Engineering in the City and Guilds Engineering College, Imperial College of Science and Technology; Professor B. M. Jones, M.A., Francis Mond, Professor of Aeronautical Engineering in the University of Cambridge; Mr. G. I. Taylor, M.A., F.R.S., Lecturer in Mathematics, Trinity College, Cambridge; Mr. H. T. Tizard, M.A., Lecturer in Natural Science, Oriel College, Oxford; with Mr. J. L. Naylor, National Physical Laboratory, as Secretary, and Mr. J. G. Gibson, Air Ministry, as Assistant Secretary.

Sub-committees of the main Committee will be appointed for Accidents, Air Inventions, Aerodynamics, Engines, Meteorology, and Navigation, with further sub-committees as required. The sub-committees will consist both of members of the main Committee and of other members.

Approval has been given for the provision of a grant from public funds, as recommended in the report of the above-mentioned Committee, towards the cost of the Department of Aeronautics at the Imperial College of Science, and the organisation and staffing of that Department under the direction of Sir Richard Glazebrook as Zaharoff Professor of Aviation, is proceeding.

The respective responsibilities of the Air Ministry and the Department of Scientific and Industrial Research in respect of aeronautical research have been defined as follows:—

(a) The Department of Scientific and Industrial Research to be responsible for provision for independent research for the advancement of science, even though it may ultimately tend to the advancement of aeronautics.

(b) The Air Ministry to be responsible for research, aiming exclusively at the advancement of aeronautics, except as regards work done at the National Physical Laboratory or by an Aircraft Industry Research Association, if and when established with the approval of the Department of Scientific and Industrial Research.

(c) Pending the establishment of permanent machinery for general co-ordination of Government research, liaison between the two Departments at the initiation and during the progress of research to be secured by confidence and by mutual representation on the Air Ministry Aeronautical Research Committee and the Research Association for the Aircraft Industry, if and when established with the approval of the Department of Scientific and Industrial Research.

## THE BLACKBURN FOR THE INDIA FLIGHT

SOME further particulars are now available regarding the Blackburn "Kangaroo" which has been entered for the *Daily Express* £10,000 prize for a flight to India and back. It has been built by the Blackburn Aeroplane and Motor Co., Ltd., who are making Mr. Kenworthy a gift of the machine, and it is of a type midway between the ordinary commercial "Kangaroos" and the special machine which started in the flight to Australia.

The engines fitted are two Rolls-Royce Falcons, each of 250 h.p., and these have received the careful attention of Messrs. Rolls-Royce with a view to obtaining from them the best possible functioning under tropical conditions. Extra large radiators are also being fitted. The fuel supply system is non-standard, extra tankage being provided to allow of non-stop flights over long stages, but it is understood that Mr. Kenworthy will only employ full tankage when necessary. The whole of the piping in the fuel system is of the flexible metal type, thus guarding against leakage due to vibration or landing shock, and at the same time simplifying work in the event of running repairs being necessary.

The considerable cargo demanded by the competition conditions will be borne largely, if not entirely, in the form of spare parts, thus rendering the flying party independent of outside help to a high degree. It might be argued that this is not a true commercial load, but, of course, any regular

service along the route in question would necessitate a series of stations supplied with spare parts, thus rendering the cargo capacity available for merchandise. This load will be carried partly in the holds normally allocated to cargo on the standard machine, and partly in new holds replacing some of the normal cockpit accommodation.

Large-size tyres are fitted, suitable for landing on sandy country such as occurs at certain points in the route to India.

It may be recalled that the "Kangaroo" type was originally developed during the War for submarine searching in the North Sea, and achieved considerable success. Long overseas journeys of this type, in all weathers, proved an excellent test of reliability and robust construction. The commercial "Kangaroos" have had a number of successes more recently. A gold medal was won at the Dutch Aero Show last autumn, and a large number of passengers were carried. Two "Kangaroos" also did good work on the London to Glasgow mail route during the September railway strike. A machine of this type has been selected to accompany Mr. Cope's expedition to the South polar regions, and recently, the North Sea Aerial and General Transport, Ltd., have been successfully operating some "Kangaroos" between Yorkshire and Holland.

On the flight to India, Mr. Kenworthy will be accompanied by Capt. Wilkins, A.I.F. as navigator.

# THE AERODYNAMIC PROPERTIES OF THICK AEROFOILS SUITABLE FOR INTERNAL BRACING

BY F. H. NORTON

(Concluded from page 483.)

## Summary

It is a rather difficult matter to compare the properties of the different sections tested because of the number of variables present. It was thought that a comparison could be best made by plotting the mean thickness of the wing against the  $L_c$ ,  $D_c$ , and  $L/D$  for various angles of incidence, and against  $L/D$  for various values of  $L_c$ . Instead of using the actual thickness of the wing the ratio of the span to the mean thickness is used, and will be termed thickness ratio. In this report the term will be applied only when the aspect ratio is six. Another characteristic of the wing is the ratio of the mean thickness of the wing to the maximum thickness, or amount of taper. These characteristics for a number of the wings are tabulated below:—

Wing No.	Mean thickness	Thickness ratio	Mean ord. Max ord.
40..	.230	78.3	1.000
41..	.314	57.3	.980
42..	.399	45.1	.837
43..	.483	37.3	.805
44..	.191	94.3	.830
45..	.271	66.5	.768
46..	.351	51.3	.737
51..	.298	60.4	.625
52..	.245	73.4	.535
16..	.477	37.6	1.000

On Plots 25 to 28 the properties of these wings are plotted against thickness ratio. It was not expected that the points would lie on a smooth curve, but it was hoped that there would be enough regularity to determine a mean line, from which the deviation of the points could be studied.

It is seen from Plot 25 that the lift coefficient decreases with an increase of thickness ratio, and, of course, will approach the values for a flat plate. As the thickness ratio is decreased below 50 the  $L_c$  at low angles begins to increase rapidly, but at high angles increases less rapidly, and at the highest lift has reached a maximum at about 37. It is interesting to notice that wings Nos. 43 and 16, having practically the same mean thickness, lie closely together up to  $6^\circ$ , after which the flow breaks on the former and its

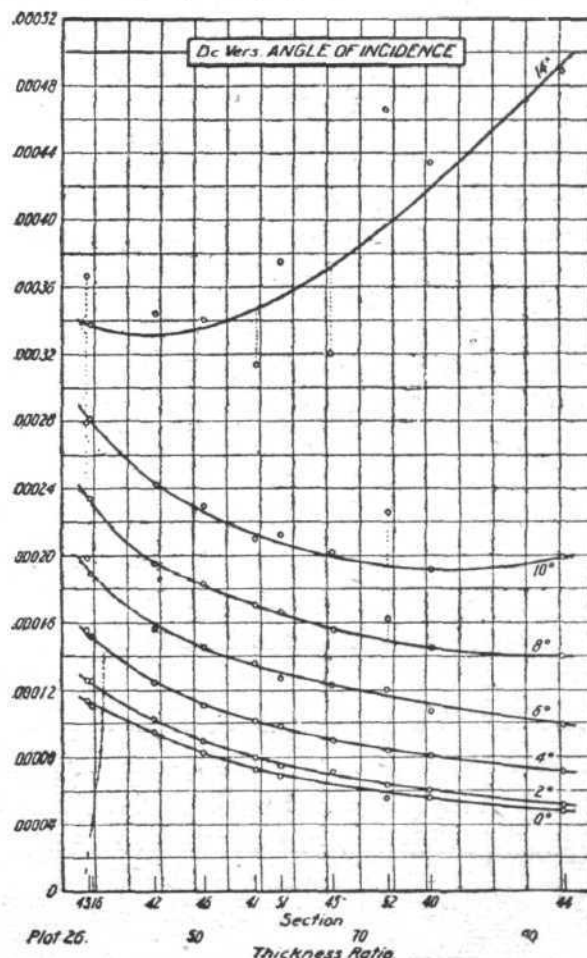
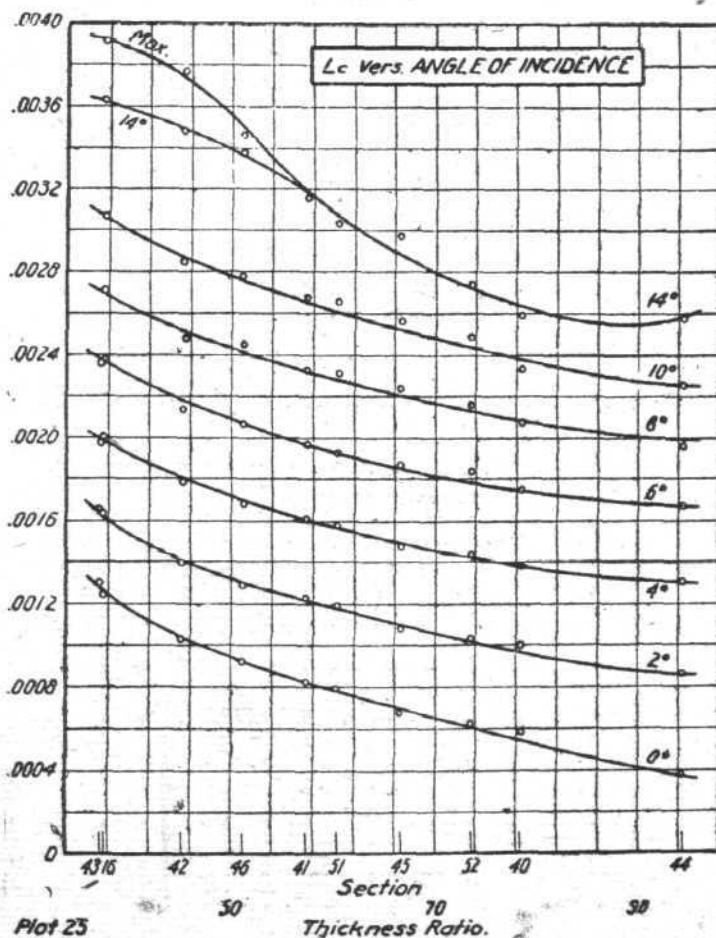
lift values at high angles are very low. All the other points lie closely to the mean curves and show nothing of interest.

On Plot 26 it is seen that the drag at low angles increases as the thickness ratio decreases, but at  $10^\circ$  the drag is a minimum when the thickness ratio is 80, and at  $14^\circ$  when it is 50. At low angles the drag is quite regular, but at high angles the points do not lie on a smooth curve. As would be expected, wing No. 43 has abnormally high values of drag above  $6^\circ$ , but below this agrees well with No. 16. Wing No. 52, and to a lesser extent No. 51, show an unusually low drag at small angles and a large drag at high angles. From the table above it will be noticed that these two wings have the greatest taper of any.

The points on Plot 27 are naturally less regular than on the others, but it is evident that the efficiency increases with the thickness ratio between  $2^\circ$  and  $8^\circ$ , but at lower and higher angles it occurs at a lower thickness ratio. The efficiency is higher with the thicker wings at  $0^\circ$  only because this angle is farther from the angle of zero lift on the thick wings and not because these wings are more efficient at high speeds. At high angles, however, wings with a thickness ratio of about 50 are the most efficient.

This is shown more clearly on Plot 28 where the efficiency is plotted against thickness ratio for various values of  $L_c$ . For low values of  $L_c$  the efficiency increases steadily with the thickness ratio, but at  $L_c$  of 0.0014 the efficiency reaches a maximum, which moves to lower values of thickness ratio as the  $L_c$  increases. Again Nos. 52 and 51 show an abnormally high efficiency at low and medium values of  $L_c$ . No. 16 shows a slightly higher  $L/D$  at all angles than No. 43.

It may be concluded from these curves that the aerodynamic properties of a series of similar wings depend in a regular way on the mean thickness, no matter what the taper. It seems possible then to predict the properties of any varying section wing with fair accuracy from a study of similar constant section wings. It is impossible, however, to exceed at any point of the wing an  $h/c$  ratio of 0.159 without exceeding the critical value. Therefore, in order to obtain the highest maximum lift, the wing should be of constant section. Wings that have a considerable degree of taper appear to have better high-speed properties than uniform section





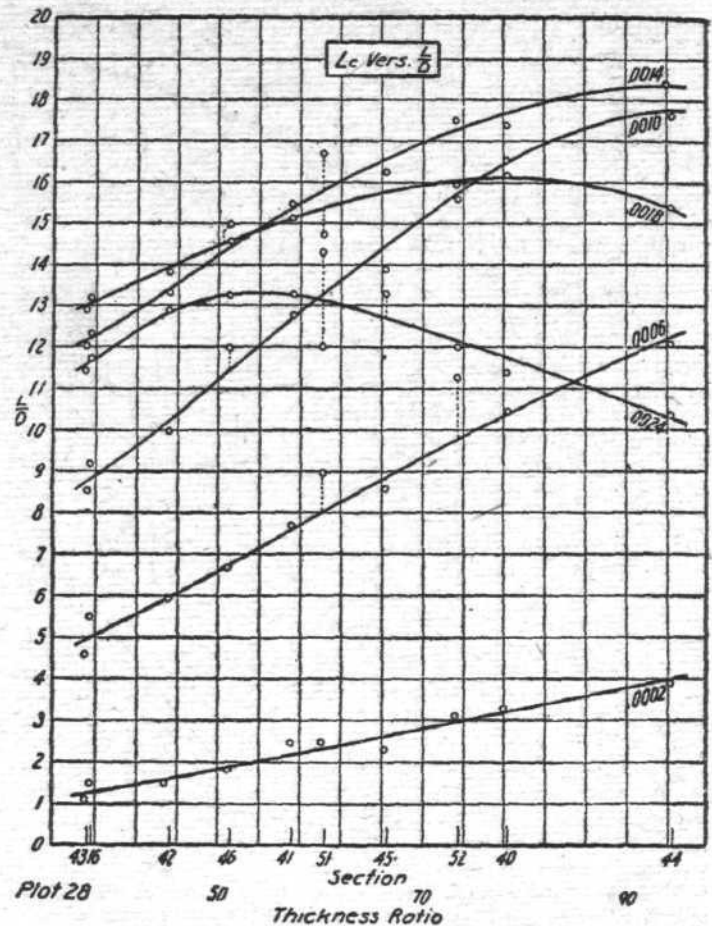
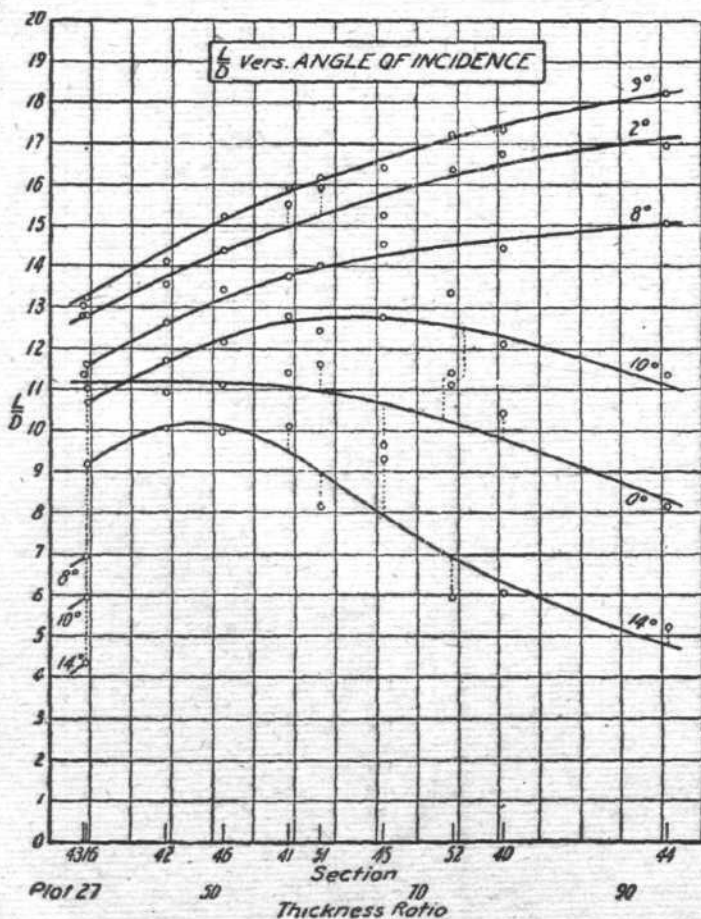
wings. This improvement is not very large, but is well outside the experimental error.

In order to show clearly the relative properties of the various sections tested and their relation to the usual types of wings, their more important characteristics are tabulated below, together with a few representative thin sections:—

Section No.	Maximum Lc.	Maximum L/D.	L/D at $\frac{1}{2}$ maximum Lc.	L/D at $\frac{1}{4}$ maximum Lc.	Lc at maximum L/D.	L/D at maximum Lc.	Minimum Dc.	Maximum h/c.
40 ..	00259	17.2	11.5	4.8	00134	6.0	000056	077
41 ..	00318	15.9	10.2	4.2	00150	9.6	000072	118
42 ..	00378	14.1	9.6	3.8	00176	9.3	000095	159
43 ..	00236	13.0	4.6	1.5	00197	12.0	000109	200
44 ..	00258	18.2	13.6	5.8	00125	5.5	000048	077
45 ..	00297	16.4	10.6	4.4	00141	9.0	000070	118
46 ..	00345	15.2	9.8	4.0	00166	8.3	000083	159
50 ..	00328	14.9	11.5	5.2	00155	7.9	000066	200
51 ..	00302	16.2	11.5	4.5	00158	5.7	000067	159
52 ..	00272	17.3	12.5	5.0	00144	8.7	000054	159
53 ..	00292	16.2	12.6	5.7	00145	7.6	000057	200
48 ..	00413	13.3	10.0	3.9	00200	8.2	000108	212
16 ..	00392	13.2	9.0	3.6	00188	6.9	000108	159
R.A.F. 6 ..	00304	16.6	11.0	4.2	00129	6.9	000068	068
R.A.F. 15 ..	00269	15.8	13.0	6.3	00103	9.5	000048	057
U.S.A. 2 ..	00322	15.7	8.8	3.1	00162	9.3	000088	063
U.S.A. 1 ..	00278	16.7	12.3	5.4	00130	9.6	000056	057

In comparison with the usual types of thin sections a thick uniform section like No. 16 shows the following differences:—

1. Thick sections may give 50 per cent. higher maximum lift.
2. Thick sections are more likely to give an unstable flow at large angles of incidence.
3. On thick sections the angle of no lift occurs at lower angles of incidence and the burble point at higher angles, thus extending the angular flying range.
4. Thick sections have a flatter drag curve; that is, the minimum drag is higher, but Dc rises less rapidly on either side of the minimum.
5. The L/D curve for thick sections is flatter than for thin sections, rising to a lower maximum, but holding a value close to its maximum at high and low angles of incidence.



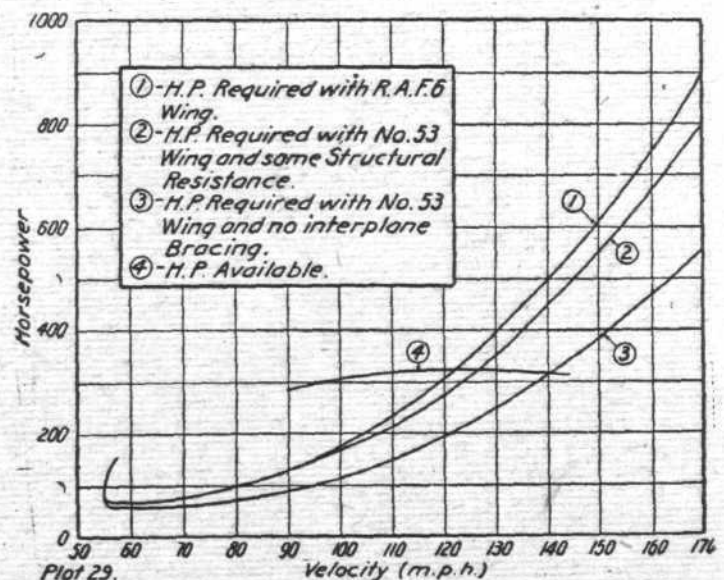
6. The centre of pressure travel of thick sections is further to the rear and of less extent than on thin sections.

7. Thick sections are more efficient at high angles of incidence.

The best tapered sections give lower maximum L/D than the thin sections, but the efficiency at all other points is as good.

By tapering the wing both in plan form and thickness it should be possible to construct a wing which has an h/c ratio in the centre (mean chord) of 0.270 and aerodynamic properties comparing quite favourably with the thin sections used now. This thickness would make possible the use of 14-in. spars on a 5-ft. mean chord. A tapered wing has the advantage of having the greater part of the lift on the portion of the wing close to the body, due both to the greater area and to higher lift sections at this part of the wing, thus decreasing the bending moment in the spars.

To illustrate the value of thick wings on a machine, the performance is plotted for a 400 h.p. 3,600-lb. biplane, using first an R.A.F. 6 section with the usual wing bracing, second, section 53 with the same bracing, and third, 53 without external bracing. No corrections were added to



the data from wind-tunnel tests, as only comparative results were required.

Section loading (coefficient of parasite resistance)	R.A.F. 6, 9.1 lbs., sq. ft. 0.036		No. 53, 8.8 lbs., sq. ft. 0.036		No. 53, 8.8 lbs., sq. ft. 0.017	
	Velocity in m.p.h.	h.p. required	Velocity in m.p.h.	h.p. required	Velocity in m.p.h.	h.p. required
2	230	3,590	180	950	180	650
0	128	370	113	228	113	155
2	92	131	90	125	90	89
4	79	93	77	89	77	66
8	63	68	64	69	64	56
12	56	65	56	66	56	57
16	55	92	55	81	55	72

From the h.p. curves plotted (Plot 29), assuming a curve of available h.p., the following summary is obtained:—

**Ordinates.**—In each case the ordinates are given for the distances from the centre of span (in inches) indicated at the top of the columns.

Chord station	No. 40*	No. 41*					No. 42*					No. 43*					No. 44				
		0	3	5	7	9	0	3	5	7	9	0	3	5	7	9	0	3	5	7	9
00	044	070	067	064	057	044	095	091	083	069	044	119	113	107	081	044	044	042	037	031	024
10	094	145	140	132	118	094	195	187	170	142	094	245	233	208	165	094	094	089	080	067	049
20	132	202	196	185	165	132	273	261	240	199	132	344	327	293	232	132	132	125	112	094	069
30	160	246	238	225	200	160	332	319	290	242	160	417	397	354	281	161	160	152	136	113	084
40	181	278	270	254	227	181	375	359	328	273	181	472	448	401	318	181	181	172	154	128	094
50	186	301	292	275	245	196	406	389	355	296	196	511	485	434	345	196	196	186	167	139	102
60	207	318	309	291	260	207	430	412	376	313	207	541	514	460	364	207	207	196	176	147	108
70	216	333	323	304	271	216	449	430	393	327	216	565	536	480	381	216	216	204	184	153	113
80	223	343	333	313	280	223	463	442	405	337	223	582	553	495	393	223	223	211	190	158	117
90	228	350	339	319	285	228	472	452	414	344	228	594	564	505	402	228	228	216	194	162	119
100	230	353	343	323	288	230	477	457	417	348	230	600	570	510	405	230	230	218	196	163	120
120	228	350	339	319	285	228	472	452	412	344	228	594	564	505	402	228	228	216	194	162	119
140	221	340	329	310	277	221	458	439	402	334	221	577	547	490	389	222	221	209	188	157	116
160	207	318	309	291	260	207	430	412	376	313	207	541	514	460	366	207	207	196	176	147	108
180	190	292	283	267	238	190	394	377	345	287	190	495	472	421	334	190	190	180	162	135	099
200	170	263	255	239	213	170	353	338	309	257	170	444	422	377	300	170	170	161	145	120	089
220	147	226	219	207	184	147	305	292	267	222	147	384	365	326	259	147	147	139	126	104	077
240	122	187	181	171	152	122	252	242	221	183	122	317	301	269	214	122	122	115	104	086	063
260	094	144	140	132	118	094	195	187	171	142	094	245	233	208	165	094	094	089	080	067	049
280	065	100	097	091	081	065	134	128	117	098	065	169	160	144	113	065	065	062	055	046	034
300	032	050	049	046	041	032	068	064	060	049	032	084	080	072	057	032	032	031	027	023	017

Chord station	No. 45*					No. 46*					No. 50† Under-surface					No. 51‡		No. 52*					No. 53§ Under-surface	
	0	3	5	7	9	0	3	5	7	9	0	3	5	7	9	0	9	0	3	5	7	9	0	9
00	070	065	056	042	024	095	087	073	052	024	000	000	000	000	000	095	024	095	055	038	027	024	000	000
10	145	134	115	087	049	195	179	150	108	049	023	020	016	009	000	195	049	195	113	077	056	049	023	000
20	202	189	161	121	069	273	250	211	150	069	042	035	029	016	000	273	069	273	159	108	078	069	042	000
30	246	228	196	148	084	332	305	256	183	084	060	052	041	023	000	332	084	332	193	132	095	084	060	000
40	278	258	221	167	094	375	344	289	206	094	074	064	051	029	000	375	094	375	218	149	107	094	074	000
50	301	279	240	180	102	406	373	312	223	102	090	079	062	035	000	406	102	406	236	161	116	102	090	000
60	318	296	253	191	108	430	395	331	236	108	100	087	069	039	000	430	108	430	250	170	123	108	100	000
70	333	309	263	200	113	449	413	346	247	113	109	096	075	043	000	449	113	449	261	178	128	113	109	000
80	344	318	273	206	117	463	425	356	254	117	116	101	080	045	000	463	117	463	269	184	132	117	116	000
90	350	324	279	210	119	472	433	363	259	119	121	106	084	047	000	472	119	472	274	187	134	119	121	000
100	353	327	281	212	120	477	437	367	262	120	123	109	085	048	000	477	120	477	277	189	136	120	123	000
120	350	324	278	210	119	472	433	363	259	119	121	106	084	047	000	472	119	472	274	187	134	119	121	000
140	340	313	271	204	116	458	420	353	252	116	118	103	082	046	000	458	116	458	267	182	131	116	118	000
160	318	295	253	191	108	430	395	331	236	108	110	097	076	043	000	430	108	430	250	170	123	108	110	000
180	292	270	232	175	099	394	361	303	217	099	100	087	069	039	000	394	099	394	229	156	113	099	100	000
200	261	242	207	158	089	353	324	271	194	089	087	076	060	034	000	353	089	353	205	140	102	089	087	000
220	226	210	180	136	077	305	280	235	168	077	073	064	050	029	000	305	077	305	177	121	088	077	073	000
240	187	174	149	112	063	252	231	194	139	063	058	050	040	022	000	252	063	252	147	100	072	063	058	000
260	144	133	115	087	049	195	179	150	107	049	040	035	028	016	000	195	049	195	113	078	056	049	040	000
280	100	093	079	060	034	134	123	103	074	034	020	017	014	008	000	134	034	134	078	053	038	034	020	000
300	050	046	040	030	017	068	062	052	037	017	000	000	000	000	000	068	017	068	040	027	019	017	000	000

\* The lower surface is plane, and ordinates given are the distances of the upper surface above this in inches.

† Ordinates below chord line upper-surface same as No. 46.

‡ Straight line between centre section and tip. Under-surface flat.

§ Upper-surface the same as No. 51.



## AVIATION IN CHINA

THE following interesting report from the Commercial Counsellor to His Majesty's Legation at Shanghai has been issued by the Department of Overseas Trade of the Board of Trade:—

The Chinese Government Aeronautic Department was quietly established last December. The headquarters will be in Peking at Nanyuan and Hsiyuan. Col. F. V. Holt, D.S.O., has been appointed Aeronautical Adviser to the Chinese Government, and is expected to set sail for China in the near future. It is reported that two Italian engineers will be engaged to superintend the work of manufacturing aeroplanes at the recently-completed workshops in Nanyuan. The department is in charge of General Tinn; he is reported as preparing for the training of aviators, the construction of aerial stations, and the translation of books and treatises on aeronautics. There are already over 30 old aeroplanes in the aviation school at Nanyuan, which will be turned into a training school for advanced students—beginners will receive their instructions at Hsiyuan. Official despatches have been sent to the provinces announcing that an examination will be held in the near future to select 150 students to receive aviation training.

It is reported in the native Press that General Tinn has decided to carry on aerial transportation with the five Handley Page machines recently purchased from Great Britain on the following lines:—

- (1) N.W. Route. Peking to Kulun via Kalgan.
- (2) Central Route. Peking to Hankow via Paotingfu.
- (3) Yangtse Route. Ichang to Shanghai via Wuchang and Nanchang.

Great interest has been shown all over China in the flights recently made over Peking by those machines.

Even more attention has been paid by the Press to the Vickers Vimy Contract to supply 100 commercial type aeroplanes to the Peking Government; but none of these have yet reached China.

Six Chinese naval cadets sailed for England by ss. *Rhesus* on April 6, to be trained as aviators in Messrs. Vickers' works.

The native and foreign Press of the Treaty ports is full of news concerning the projected Rome-Tokio flight, its progress and delays, and the exhibition of Italian aeroplanes recently provided by the Italian aviators at Shanghai was well attended.

The Aero Club of China has come into being at Shanghai with international membership. The Chinese Naval Club held a banquet in honour of the Italian flying men, who have arrived to prepare for Annunzio's reception, the hosts being representatives of the Chinese Government.

Encouraged by initial success in the field of aviation, the Chinese have decided to participate in the first round-the-world aerial Derby, which is said to have been postponed till next year in order to allow the Chinese aviators time for preparation.

The Macao Aerial Transport Co., a subsidiary service in the route arranged by the Far Eastern Aviation Co., is now in course of formation, and on completion will include Macao, Hongkong and Canton in its field of operations. A hangar has been established near Macao, and a permanent terminus will later be set up in the Macao territory. Shares are being issued at \$10. Mr. Ricou, a prominent French merchant of Macao, is responsible for the undertaking. It is said that several million dollars have already been subscribed, and Mr. Ricou has secured the distributing agency for the Curtiss machine. He has contracted to purchase 135 machines during the next three years at a cost of more than \$3,000,000.

Eleven of these machines have already left New York, and are expected to arrive in Hongkong towards the end of March. They were made for the U.S. Navy, but have been remodelled for passenger service. They are fitted with Liberty engines and are capable of making a continuous flight of 650 miles and carrying 14 passengers. These eleven aeroplanes, with spare parts and supplies, are valued at \$400,000 in the U.S. It is reported that pilots and mechanics for service in the Far East are being recruited in the States, and will sail soon for the Orient.

An aerial service under the auspices of Mr. Ricou between Hongkong and Macao was inaugurated on February 17, when the distance was covered by seaplane in 23 minutes. A regular service between these places and Canton will be maintained in the future.

Mr. Walter Bonner, general superintendent of the proposed Far Eastern Aerial Service, reached Shanghai on February 26, accompanied by 18 American aviators, mechanics and specialists. It is reported that this company will be capitalised at \$600,000, and that it will operate between Hongkong and Shanghai, via Canton, Swatow, Amoy, Foochow and Ningpo, as well as between Hongkong and Foochow via Luzon and Formosa.

Beyond the subsidiary service at Macao, however, no definite plans have yet been formulated.

One private aeroplane is being imported by a British subject at Shanghai, Major McBain, M.C., of the R.A.F., who has prepared a hangar and landing stage in the suburbs but the machine has not yet arrived, and no flight has yet been made by him.

## ROYAL AERONAUTICAL SOCIETY NOTICES



**Lectures.**—Dr. L. Bairstow will preside at Maj. Linton Hope's paper on "Notes on Flying-Boats," on Wednesday evening, May 12.

The following lecture will take place on Wednesday, May 26, when Sir Richard Glazebrook will read a paper on "Some Points of Importance in the Work of the Advisory Committee for Aeronautics."

**Journal.**—The May number of the *Aeronautical Journal* will contain full reports, with discussion, of Maj. C. F. Abell's paper on "Airship Machinery, Past Experience and Future Requirements," and Professor Melvill Jones' paper on "Flying over Clouds," together with a report of the Annual General Meeting and the balance-sheet for the year 1919.

### Aerodynamics Chair at the Imperial College

It is announced that Dr. Leonard Bairstow, C.B.E., F.R.S., has accepted the professorship of aerodynamics at the Imperial College of Science and Technology.

Dr. Bairstow is a fellow and a member of the Council of the Royal Aeronautical Society. He joined the Air Board in 1917, and was responsible, as technical adviser on aerodynamics, to Colonel Ogilvie, who was then in charge of the research department. He is a member of the Advisory Committee on Aeronautics, and of Lord Weir's Committee, and also a member of the Air Inventions Committee.

### Honouring the S.A. Flyers

The Anglo-African community will entertain Lieut.-Col. H. A. van Ryneveld, D.S.O., M.C. and Major C. J. Q. Brand, D.S.O., D.F.C., M.C., to a banquet at the Savoy Hotel on May 18, in honour of their great flight from London to Cape

Copies of various back numbers of the *Journal* and Annual Reports have recently been obtained and are available. Prices on application.

**Library.**—A complete set of Technical Memoranda issued by the Air Ministry, as well as of the Reports and Memoranda issued by the Advisory Committee for Aeronautics have been placed in the Library for the use of Members.

**Air League.**—Maj.-Gen. Sir R. M. Ruck has been appointed to represent the Chairman on the Committee of the Air League.

**Technical Terms Committee.**—The next meeting of the Technical Terms Committee, which is No. 1 Sub-Committee (Nomenclature) of the Aircraft Section of the British Engineering Standards Association, will be held at the Society's offices at 5.0 p.m. on Friday, May 14.

W. LOCKWOOD MARSH,  
Secretary

Town via Cairo. Mr. Churchill will preside, and will be accompanied by Mrs. Churchill. The Acting High Commissioner for the Union of South Africa, Mr. R. A. Blankenberg, is the chairman of a representative committee. Tickets can be obtained at £2 10s. each, inclusive, from the hon. secretaries, Anglo-African Banquet, 801, Salisbury House, E.C. 2.

### To Our Readers

As we continually receive complaints from readers that they experience difficulty in obtaining their copy of *FLIGHT* promptly each week, we draw their attention to the subscription form which is printed on page xxii of the current issue. If this is sent, accompanied by the appropriate remittance, to the publishing offices, 36, Great Queen Street, W.C., it will ensure *FLIGHT* being received regularly each week upon the day of publication.

## CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

## COMMERCIAL AIRSHIP SERVICE

[2018] The lecture given by Air-Commodore Maitland before the Royal Society of Arts makes an excellent basis for discussion as to the feasibility or otherwise of getting a commercial airship service on a paying basis in the near future. The subject cannot be too much ventilated, as it must be largely from lack of knowledge of the present possibilities of lighter-than-air craft that has allowed the British public to acquiesce so far in the loss of the start we obtained under the Armistice terms, in the competition for the aerial transport business. In a few months Germany will be able to meet us on equal terms. Germany is still ahead of us in constructional work, chiefly because our airship officers have never been allowed to have the type of ship they asked for, and because during the War no constructional firm was told to go ahead and produce a "Class" of, say, 12 airships in the shortest possible time, so that the period required to construct a ship in this country is about four times as long as in Germany. We are, however, ahead of Germany in mooring and handling of airships of all classes, so that on the balance there is not much to choose between us.

With your permission I propose to criticise some of the figures given by Air-Commodore Maitland, in the hope that it may lead to others doing likewise.

Air-Commodore Maitland appears to have based his figures on an airship following German practice, for war requirements, and not particularly suitable for them, as proved by modifications made in later German design. I propose to consider ships with the existing type of hull, but with modification to the power plants to make them suitable for commercial work.

The present practice is to take a fast-running aeroplane engine, and, in order to allow of a large slow-running propeller being fitted, a gear-box weighing about as much as the engine is introduced, with the result that the gain in the efficiency of the propeller is more or less balanced by the loss of efficiency in the gear-box, the weight of the power plant is about doubled, and its reliability decreased by half, as a large proportion of the troubles in the normal power unit occur in clutch or gear-box. To look after this mechanism we carry round two mechanics per engine who keep watch and watch.

The power units for a commercial airship must be contained in a long narrow car with an engine at each end driving direct, or off the camshaft, a variable-pitch propeller. It has been proved by many hundreds of hours' running in coastal airships that one mechanic can look after two engines for at least twelve hours. For stages of under 700 miles an eight-engined airship may be expected to operate with an engineer-officer, who would be permanently attached to the ship, and four mechanics who would be changed at the end of each stage. For trips of over 700 miles eight mechanics

would be carried. Also the engines will be fitted to burn hydrogen which reduces the cost of petrol by 20 per cent. for a given trip, and also allows of a corresponding increase in passenger and cargo capacity. If we can save six mechanics on the trip to India and back and take passengers instead, we gain fares to the extent of £1,200. We also save on the wages of the crew. Then, taking round figures, an airship's engines developing 1,000 h.p. will consume 500 lbs. of petrol per hour. If we save 20 per cent. of this by burning hydrogen, we save 1,200 lbs. in 12 hours, so that we can take six more passengers on a 12-hour trip, and proportionately more on longer flights. Twelve extra passengers in all to India and back, therefore, means £2,400 in fares. On the basis of a weekly service to India, as taken by Air-Commodore Maitland, and neglecting the saving on wages for crew, we save £2,400 per week, or £124,800 per annum, by remodelling the power plants and assuming that the extra passengers we can carry are available. If they are not we still save £62,400 on the year. In round figures it means that the running-cost of the airship per mile would be £1 instead of £1 3s. 5d.

*Cost of Running Bases.*—Air-Commodore Maitland has charged the whole cost of the bases to the flying airships. This seems unreasonable. During the War part of the personnel of an airship station was employed in keeping airships in repair, in clearing and levelling the ground, at training and drill, running transport and cleaning duties, etc. In peace time a large number of men will be available for productive work when not engaged in handling airships into the sheds. The annexes of the airship sheds form excellent and well-lighted workshops with good railway connections, and there is no reason why some industry, such as motor-car construction, should not be carried on. There is also about 1,000 acres of land for cattle grazing, etc., available, which will employ a certain number of men and bring in a revenue. It is thought that the cost of the base should be at least halved to begin with (allowing a year to get the industries at the bases started), and put at 5s. 6d. per mile flown. With the 3s. 5d. per mile saved by remodelling the power plants, our total cost per mile comes down to 32s. 6d. per mile flown, as compared with 41s. 5d. given by Air-Commodore Maitland, or 2s. 2d. per ton-mile, as compared with 2s. 9d. Making the same allowance as the lecturer for reduction in running costs by increasing the capacity of the airship to 4,000,000 cub. ft., we get a cost per ton-mile of 1s. 2d. With every increase of size the cost of running will decrease, and a further saving will result in the use of paraffin or heavy oil as a fuel.

There appears little doubt that the airship is distinctly a "commercial proposition," over the sea routes and over low-lying country. Operating over mountain ranges is another matter.

"PER MARE PER AERA."

## What Germany Says

In a statement issued by the Ministry of Defence in Berlin on April 29, it is stated that Germany has placed at the Entente's disposal her entire available stock of aircraft—namely 400 aeroplanes and 820 engines. It states that among the artillery offered to the Entente are 217 anti-aircraft guns. It states also that there are 60 anti-aircraft guns at Königsberg and 18 at Königstein, near Dresden.

## In the Jordan Valley

In connection with the hostilities between the British Indian troops and Arabs in the Jordan valley, an aeroplane reconnaissance on April 23 reported much activity in a valley south of Beisan, and the railway and telegraphs were found to be cut near Jisr Mejanie. One troop which was sent out encountered 30 Arabs, and two more troops which were despatched at dusk charged with the lance, killing 15 Arabs. On the 24th the garrison of Semakh were attacked at Jordan by about 2,000 Arabs; their charge was repulsed, but the defenders were compelled to retire to the town. One of our aeroplanes was shot down inside our lines, and the pilot wounded.

## U.S. Naval Aviation Vote

As a result of the speech made by Senator Lodge during the debate on the Naval Bill, the Senate agreed to an increase of the amount allowed for naval aviation purposes from \$15,876,000 provided by the House of Representatives to \$25,000,000 (nominally £5,000,000).

Senator Lodge also pleaded for "a capable and independent fleet on the Pacific Coast, for if dangers come they will be from that quarter."

## American Aviators Aiding Poles

WORD comes from Warsaw that American airmen are taking part in the advance into Ukrainia, although the weather is unfavourable for flying. They should be able to render good service at the few points where the Poles have been held up by the resistance of small rearguards supplied with machine-guns.

## Polish Bombs on Kieff

TELEGRAMS sent by the Bolsheviks on April 28 from Moscow declare that "Polish bandits" have dropped bombs on Kieff, killing 10 and wounding 14 persons.

## German Pilots in the Argentine

A NUMBER of German officers who saw service in the German flying corps during the War, are said to have arrived recently in Argentina with a view to joining the flying service of the Republic.

## High Flying in Bolivia

AN interesting flight above the Andes was made on April 17 by a pilot named Hudson, who has been engaged by the Bolivian Government to take charge of the aviation school, when he succeeded in flying a Curtiss (Wasp) machine starting from an altitude of 12,000 ft.



# **ORISMS** **FROM THE FOUR WINDS**

CONGRATULATIONS to Maj.-Gen. Sir Frederick H. Sykes, K.C.B., upon the announcement of his approaching wedding to Miss Isobel Bonar Law. In all probability the marriage will take place in June.

THIS year, the plans for the great Three Services Royal Tournament at Olympia, starting on May 20, are more fascinating than ever. Sombre khaki naturally now gives way to a brighter scheme of colour, to the mutual benefit of the tournament and the public. A striking feature will be a pageant illustrative of Britain's military history. In this, men of the 1st Grenadier Guards, stationed at the Tower, will appear in the uniforms of the 18th, 19th, and 20th centuries. Every armoury and military store in the country has been searched in order to secure a correct presentation of the soldiers of various periods as to dress and equipment. A party of Grenadiers in the uniform of the earliest Guards will give a display of old-time drill. There will also be some practical display of military war methods, elaborate musical rides and jumping contests, physical-training drill by a contingent from the Royal Air Force Technical School at Halton, besides a perfect glut of other attractive items. In fact, the 1920 Tournament will be a real Peace celebration Show. Specially looking after the R.A.F. side of the entertainment are such representative officers as Group-Capt. J. G. Hearson, Squad-Leader E. G. H. Clarke and Wing-Comdr. A. S. Barratt.

KING GEORGE will visit the Tournament on the afternoon of May 29, when His Majesty will be received by a Guard of Honour, with band and King's Colour from the Foot Guards, and also by a guard from the Royal Navy.

AEROPLANES are patrolling the whole Palestine frontier in connection with the Arab raiding expeditions which have recently required the severe attention of our military command out yonder.

THAT refusal upon "technical grounds" of a licence for the supply of other than pussyfoot abominations at the Waddon aerodrome hotel has now been "lifted." Following a ruling of the High Court, the Surrey County Licensing Committee have now issued the necessary permission for the purveying

of "thirty under" and other similar camouflaged non-intoxicants, including Government "beer."

APPARENTLY, so far as aviation is concerned, there are at times advantages to be reaped from the practice of polygamy. There is, however, no reflection in this suggestion upon the characters of our pilots. It just emerges as a tail-end moral in the following report from a contemporary of a lightning interview with Col. van Ryneveld, upon his return to England following his attempted Brooklands-Cape Town flight with Maj. Brand as companion pilot. "What struck us as remarkable," Col. van Ryneveld said, in referring to the many strange adventures which they experienced, "was the forest-belt, which, starting 200 miles south of Khartoum, extended, unbroken, until we reached the Limpopo. As it commenced—first with low bush and then more and luxuriant vegetation—so it finished, dwindling away to mere scrub on the Karroo desert.

"At a height of from 11,000 to 12,000 ft. we met numbers of migrating birds, including storks. On another occasion, when flying 7,000 ft. above the open desert, we came across two flights of wild duck. I am convinced that these birds climbed to these heights in order to strike a favourable wind to help them in their migration.

"It was very curious when, in the Southern Sudan, Uganda, East Africa and Northern Rhodesia, we had occasion to pass closely over some villages on the hills, we noticed that not a single inhabitant was visible—only a few chickens. They had apparently 'got the wind up,' and had instinctively taken cover.

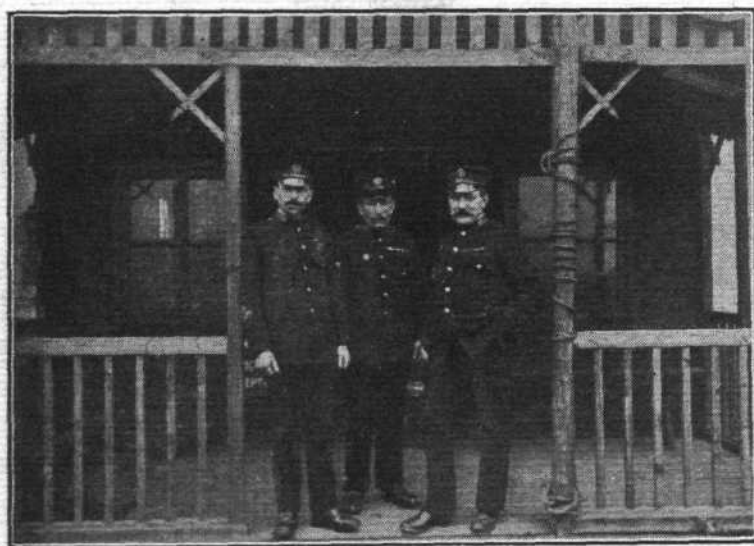
"At Shirati, on the shores of the Victoria Nyanza, we, on landing, found that the natives regarded us as gods, and brought peace offerings of milk, food and fruit, while an old chief came out with goats and sheep, and wanted to kill them for us. We made use of the old chap, however. We told him that the machine would not go on until it had had its morning bath, and he, straightway, set his 43 wives to clean and oil it up, which proved very welcome to us."

A POLICE court contra account bargain, or what looks uncommonly like one, with a defendant, is another little innovation which now stands to the credit of aviation. It happened this way. Summoned at Croydon for riding an unregistered motor-cycle, and having no red rear light, Rene Tondeur, an aerial engineer, of Chapel Street, Marylebone, sent a letter to the court by aerial post from Paris, in which he said he should not be returning for some time. As this was the first such letter received by the bench, so much interest was evinced in it that eventually Mr. C. Hussey, one of the adjudicating magistrates, bought it for 10s.

Defendant was fined 30s. and costs.

It is, perhaps, only cricket to note that Croydon Hospital benefited to the full extent of the half Bradbury paid by Mr. Hussey.

Apocryph of air-post stamps, further additions to the already existing long list are to be noted. A special commemorative stamp was affixed by the Australian Post Office to the letters carried by Sir Ross Smith on the first flight from England to Australia. This stamp, which is without expressed value and printed in blue, was stuck upon the 320 letters received by aerial post by the Commonwealth postal authorities before delivery to the addressees in Australia. The design is somewhat larger than that of an ordinary postage stamp, and represents a Vickers-Vimy machine flying through the clouds above a portion of the terrestrial globe on which appear in colourless outline maps of the British Isles and Australia, while between them, in the centre, is a flaming torch. The only inscriptions read:—"First Aerial Post—England-Australia," "November 12-December, 10, 1919." A special postmark was used indicating the date of arrival in Melbourne—namely, February 26, 1920. Although, strictly speaking, not a postage stamp, since it did not pay postage, this commemorative label constitutes a notable souvenir of the progress of the post in the air and will undoubtedly be in considerable demand by collectors of air post stamps.



AT HOUNSLOW: A trio of ex-Service men. From right to left: C.S.I.M. H. Hampton, V.C. (won in South Africa, August, 1900, at Van Wyke Vlei, while serving with the King's Liverpool Regt., Mounted Infantry, for carrying out of fire L.-Cpl. Walsh of same regiment, and holding position against long odds when wounded himself in the head and both legs); Farrier-Sergt.-Maj. Dawson, R.F.A.; and S. A. Rigby, Royal West Surrey



In Tunis the fee upon letters transmitted by air has been raised from 30c. to 75c., and an air-post stamp of the higher denomination is about to be provided. A new 10 centavos express letter stamp, issued by the Republic of San Domingo, has for its design a vignette of a biplane in flight, but it is not stated if letters bearing this supplementary fee are conveyed by aeroplane.

THE recent calamity to Maj. Moon and his companions has given Maj. T. Orde Lees another good text for hammering in the necessity for providing parachutes against emergencies such as this episode. Maj. Lees writes: "Nothing calls attention to the need for life-saving appliances in aircraft so much as loss of life for the want of them. The death of Maj. Moon, a very gallant officer, and three companions in a flying-boat is a case in point. As reported, the air-boat got out of control at 1,700 ft. This would have given most of the crew ample time to use their parachute had they been fitted. Just a year ago the writer fitted a parachute to one of the flying-boats at Felixstowe in the presence of Maj. Moon, who said at the time that he considered them unnecessary on this type of aircraft, as fire in the air was unknown, and in the event of other accidents a flying-boat could almost certainly alight on the water. Since then the writer has made several parachute descents from flying-boats—one of them from the Transatlantic American NC 3—and is able to say that they are the easiest type of aircraft from which to make an emergency drop in a parachute; they also lend themselves more readily than any other type to the installation of life-saving parachutes."

WHETHER the following "parachute" adventure, as detailed in the *Daily Chronicle*, is to be welcomed as a contribution to the solution of the subject, is more than doubtful, however. A 16-year-old page-boy, Sydney Thompson, at Orton Hall, the Peterborough seat of the Marquis of Huntley, a short time ago informed the servants' hall of his departure in a message reading, "I have run away. You won't see me again because I am fed-up.—Sydney." Nothing further has been heard of the lad, in spite of diligent enquiry through police and other sources. The idea that he is "cinema struck" would appear to have more than a mere surmise to justify the suggestion, as the following little one-boy drama bears witness. Sydney, about a fortnight previously, it is related, secured a piece of chintz, used by the Hall housemaids for dusting the fire grates, tied the corners together and attached a piece of cord to form a parachute. It was a very gusty day, but, undeterred, he went up the water tower of the Hall and took a flying leap from a height of between 30 and 40 ft. No sooner had he left the tower than the wind carried the parachute out of his hands. Fortunately for the lad, he fell on the leads, 6 ft. below, with nothing worse than a severe shaking.

The parachute was carried some distance, lodging in the top of a tree in Orton Churchyard, where it still remains. It is stated that Sydney had been in communication with a cinema firm in London, and he may have gone there to seek his fortune. But how about those boys the R.A.F. are asking for? This servants' hall hero seems very aerially inclined.

DISTANCE possibilities of visibility in connection with the statements by "Aeronaut" reproduced in *FLIGHT* on April 22, are in reply forthcoming from Mr. G. M. Butterworth, "before the War, of Christchurch, N.Z." The wonderful views, which Mr. Butterworth is able to recall accurately, as having seen, carry with them useful evidence upon this subject of distance and visibility. He summarises his "views" as follows:—

England: Once, and only once, did I see from the top of Dunkery Beacon the Malvern Hills, no doubt the Herefordshire Beacon—distance at least 80 miles.

France: From the top of Mont Blanc from 9.30 a.m. to

#### A Meeting at Bournemouth

In spite of rain and wind, a successful meeting was held at Bournemouth on May Day. Crowds witnessed the events, but there were not as many passengers as were expected. Mainly due to the bad weather, only three Avro's, 110 h.p., took part in the race, and all the machines started together.

The course was from the Aerodrome to Longham Waterworks and back three times, a distance of 12 miles, and the machines were in view of the crowd the whole time of the race. They rounded the turning points in a bunch, and the winner only won by a length.

Sergt.-Pilot Tollerfield was the winner, completing the course in 7 min. 10 sec. Capt. Saddler was second, arriving 2 sec.

10.15 a.m. the view was perfect; the whole Arc of the Jura clear in every detail from Aaran to Geneva—the Appennines in sight. The chalet and its out-houses on the Weissenstein above Solothurn visible to the naked eye—distance 95 to 115 miles. In turn, from the top of the Weissenstein, Mont Blanc in every detail was plainly visible to me for three days.

New Zealand: From the top of Banks Peninsula I have, day after day, year after year, walked for hours at a time devouring the procession of the view commencing at Cape Campbell (the Kaikourar), and ending with Mount Cook, the monarch of our Southern Alps. The mountains are 230 miles apart as the eagle flies. As I walked I was 120 miles away from the Kaikourar and 100 miles from Mount Cook. As the sun continued to move north from his rising, so peak after peak in orderly succession appeared, and commencing at the north-east end of my view, one by one and in regular turn disappeared.

Mount Cook: I have bicycled from Ross (20 miles south of Hokitika) to Greymouth, on to Reefton, down to Westport, and so on to Seddonville with Mount Cook constantly in sight—at Seddonville he must be nearly 175 miles away—and seen from Seddonville he is almost as glorious a sight as Mont Blanc seen from the Dole.

But is there any sufficient reason to doubt the statement of the keeper of the Rest House on Mount Egmont, that more than once in north-west weather, from the summit of Mount Egmont (8,260 ft.), he has clearly made out Mount Cook in spite of the intervening 350 miles? and surely the Hills of Carthage are visible from the top of Ætna; and I believe (but dare not be sure) that my father—a very accurate observer—saw them.

In New Zealand the "nor-wester" annihilates distance in a manner and to a degree which the incredulous European cannot be made to comprehend, but then for years he treated our Pelorus Jack as but a legendary dolphin and the hero of an incredible fish yarn.

ANOTHER correspondent, Mr. Stephen Wilkinson, A.F.C. (late Pilot Officer, R.A.F.), writing upon curious balloon achievements; sets out a very remarkable adventure, which, as he suggests, as a feat, has never been done before and is extremely unlikely will ever be repeated. Mr. Wilkinson recalls the story of his trip as follows:—

On the night of May 30, 1918, I was pilot in charge of a balloon detailed for a night flight from an aerodrome near London with eight R.A.F. officers under instruction. The balloon was of the ordinary spherical type, containing 80,000 cub. ft. of coal gas. I left the ground at 10.15 p.m., and at a height of 5,000 ft., proceeded almost due north-west, until, when over Hammersmith, I descended to about 600 ft. to find the wind blowing almost south-west. I continued at this altitude until we were well over Richmond Park, and it was at this juncture that I decided to try and return to my original starting place. This I eventually succeeded in doing by manoeuvring at different altitudes for varying currents, and I eventually landed exactly as a neighbouring clock struck midnight, within a few feet of my original starting place. The time in air was 1 hour 45 minutes, and the total distance travelled was some 10 miles. The night was a very dark one, there being no moon, and I piloted my way by means of a  $\frac{1}{2}$ -in. to the mile map, making note of the few dim lights below in the form of railway stations and trains, which were discernible from time to time. As it was during the War that the flight was made there were very few lights to be seen below.

To those readers who are interested and understand such matters, I would add that I did not use the trail rope or grapnel, neither of which were uncoiled. I have heard of cases where a balloon has landed within a mile or so of its starting place in the daytime, but the above flight took place between 10 p.m. and 12 midnight, on a very dark night.

later, with Capt. Mathews third. A trophy was given to the winner, and 25 guineas by the Bournemouth Town Clerk, Mr. W. H. Ashling, who complimented Sergt. Tollerfield on his second success, and also commended the enterprise of the Bournemouth Aviation Co.

During the afternoon a descent on a Guardian Angel parachute was most successfully carried out by Miss Doris Marshall. Although the weather precluded dancing on the green, the Winton Town Band was in attendance, and gave selections in one of the hangars. The Westland Limousine visited the grounds during the afternoon, and made a very favourable impression, and another aerial visitor was Mr. Chapman, of Leatherhead.



# AERIAL TRANSPORT FROM THE BUSINESS POINT OF VIEW\*

By MAJOR-GENERAL SIR SEFTON BRANCKER

AERIAL transport must include airships as well as aeroplanes, and, generally speaking, my notes apply to lighter-than-air service as well as heavier-than-air—but when I do touch details, I will confine myself to heavier-than-air. When I allude to aeroplanes, I wish to include seaplanes.

Now, aviation has no complete analogy and no applicable precedent in the past. I used to try to fether military aviation to the orthodox Army organisation—but it was impossible—old-established methods of supply, command, organisation, etc., would not fit the new arm. It always needed special treatment by a special department who knew it and understood it. There are many lessons to be learnt from sea, rail and road transport, but the expert in any one of these activities who thinks that he can apply his own rules rigidly to aviation is certain to come to grief.

This same principle should also apply to the attitude of government with aerial transport. It is a *new* trade which has yet to be created, and a trade which demands a higher standard of personal efficiency in the men employed therein than any other because of the delicacy of its equipment and the inherent danger of flying; it cannot be handled by methods which apply to locomotion, means of which have existed for hundreds of years.

Aerial transport operations can be divided into three distinct categories:—

(1) *Regular express service*—carrying mails, parcels and passengers at a very high speed punctually to a fixed timetable, as a supplement to the ordinary means of transport by rail and boat. Special aircraft could be provided in such a service to run at any time to any place in addition, just as a special train is provided.

(2) *Irregular services*—carrying all commodities over tracts of undeveloped country in which roads and railways do not exist or are extremely bad.

(3) *Aerial survey*—including—the survey of undeveloped country; fire patrol in large tracts of forest; correction of plans of towns; the location of whales, seals and fish, and so on.

Each of these three categories requires different equipment, handling and organisation.

The *regular services*, to be of real value to the public, must be very much faster than other means of communication and *must run to time*. Very fast aircraft of at least over 110 miles an hour are, therefore, essential, and flights must be carried out practically regardless of weather. Weight-carrying power must be sacrificed for speed; the personnel employed must be highly efficient, and, to get all this, rates must be high. A service on these lines, properly organised in comparatively short stages, should average 100 miles an hour day and night.

The London-Paris service is a good example of this, and the promised Cairo to Karachi service must also be run on these lines. Airships operating over the longer distances, e.g., the Atlantic, can fly slower. Air Commodore Maitland estimates the speed required to be 60 miles an hour.

The *Irregular Service* does not make such high demands. Speed is of less importance, and weight-carrying power can be increased. Running to time is unnecessary, and the saving of a few hours—or, indeed, a couple of days—over a route, which may take a month to traverse by other means, is a matter of small importance. It will be possible to wait for good weather and for full loads. Such services should be invaluable in undeveloped countries, and the cost will compare quite closely to other means of transport. Examples of this can be found between Khartum and the Great Lakes, and between Fort Jamieson and Blantyre, and in many other places in Africa, Australia and elsewhere.

The *third category*, aerial survey, is rather different. It can hardly be called aerial transport proper, and personally I think that, as this side of aviation develops, the aircraft employed will probably be owned and maintained by the organisations which they are serving, and not by aerial transport companies. Speed and weight-lifting are of no importance, and flying would not take place in bad weather. Almost any air-worthy aircraft can perform these duties, and, in many cases, the small airship would undoubtedly be the best craft for the purpose.

The first two categories have a good deal in common, and may to some extent be compared to the big mail-carrying shipping companies and the tramp steamers of the sea. Both have one basic problem in common, the distance over which it is economical to fly without landing and filling up

with petrol. Personally I think that if a longer stage than 300 miles with an aeroplane or seaplane is flown, petrol is being carried from point to point at exorbitant rates, and is eating up useful carrying power. In uncivilised and undeveloped countries it may be necessary to fly further without filling up, but not often.

At present the aeroplane is essentially a short-distance vehicle; its advantages are its speed and its power to surmount obstacles. For long distances during which no stop is to be made the airship, with its greater lifting power, is far more suitable. If long distances are to be covered by aeroplanes, they must be broken into stages of 300 or 400 miles, at which fuel can be obtained and pilots and aircraft changed if necessary. Airships and aeroplanes are not rivals at present, except for the money necessary to develop them. On the contrary, they should be close and loyal allies, whose co-operation will materially assist the development of aerial transport.

The business man will accept the fact that if these functions can be performed efficiently and economically, commercial aviation is at once a business proposition and a very valuable asset to commercial development generally; but the business man has two very serious criticisms—he charges aviation, firstly, with being too unreliable, and, secondly, too expensive—and I will now try to examine these charges and see how they can be refuted and certain admitted weaknesses can be met and eliminated.

Let us take the accusation of unreliability first:—

Unreliability is the result of three factors:—

- (1) Personal error.
- (2) Failure of material.
- (3) Weather.

Take personal error first. This can be eliminated to just as great an extent as it has been in the navigation of big ships, in the running of express trains, and in the driving of motor cars. A mistake in the air may have worse—or, at all events, more fatal consequences than a mistake on sea and land, and, therefore, the qualifications demanded from aircraft pilots must be more comprehensive and exacting than is the case in the other transport services. But plenty of suitable men can be found; the piloting on the London to Paris service has been wonderful; there has only been one accident, resulting in any injury to personnel, in nine months of continuous flying; bad landings have been practically unknown.

Pilots must be carefully handled. A pilot flying on a regular service through any weather must be given short stages and plenty of rest. London to Paris is quite far enough for one stage in *bad* weather; any further distance puts too great a strain on the pilot, and will be conducive to a desire to take refuge in at intermediate landing-places instead of pushing straight through. In irregular services, where flying is not necessarily carried out regardless of weather, the pilot can be called on to do more, and also on regular services in happier climates than our own. One of the great problems of the future is to give the pilot sufficient work to fill up his time without straining him by too much time in the air and to keep him healthily amused when he is not flying. This will be particularly difficult in the case of pilots working over stages in an undeveloped country with an unhealthy climate, such as some parts of Central Africa. At present between London and Paris it has proved necessary to give pilots periodic leave every three months, more for the purpose of relieving the monotony of life than for rest. The whole problem of the future status, responsibilities, and administration of aircraft pilots and crews is a very interesting and complicated one, but I am sure that personal error on the part of the pilot can be practically eliminated altogether.

The next source of unreliability is mechanical breakdown. The design and manufacture of both engines and aeroplanes have reached such a pitch that with proper organisation and maintenance mechanical breakdown of these individual units should never occur. Installation still leaves much to be desired. The flights interrupted by mechanical defect on the London to Paris service total only 14, and practically all these were cases of failure in installation only. Beyond this, reliability of equipment is largely a matter of good organisation, administration and personnel.

The mechanics must be of the very best, and inspired with that sense of duty which was created in the service, and which has no equal in any other branch of transport. Periodic inspection and overhauls must be most carefully carried out, and the shorter the flights within limits the easier it is to ensure

\* A paper read before the Royal Aeronautical Society on April 29.



that nothing can go wrong. As I will show later, profits depend on how much work can be got out of a given amount of equipment, but if aircraft are not over-worked and are properly looked after, failure of material should never occur.

Now I will come to the one serious cause of unreliability, the weather. If it was not for climatic conditions, aerial transport would be a sordid certainty tomorrow, and would run with greater regularity than trains or ships. It is the climatic element which is at once the most interesting factor and the most dangerous enemy of aerial transport, and rapid weather-reporting is going to be the very life-blood of the industry.

*In the old days wind and storms* made flying impossible, and now we laugh at them. A fast, powerful aeroplane will fly through almost any wind so long as it can get off and land without being blown off. Storms can be foretold, seen, waited for, or circumvented. A heavy snowstorm is the worst form of storm, and is a serious difficulty.

Airships are more affected by storm and wind than aeroplanes, but, as Air-Commodore Maitland has pointed out, they will follow the weather in their long world-wide flights just as the sailing ships of the old days followed the trade winds.

*Varying climate conditions* will give trouble. We have heard of the difficulties of getting off the ground in hot weather in India and on the high, warm plateaux of Africa. We know that in Asia and Africa there are areas in which it will be necessary to pave aerodromes to make them usable during the rainy season. We know that intense heat warps wooden spars and slits propellers.

So far as the aeroplane goes, climatic conditions can be met in almost any part of the world by using specially designed or modified types of aircraft or by carrying lighter loads in certain conditions and by ground organisation.

The only form of weather that offers a really difficult problem is bad visibility, and, fortunately or unfortunately as the case may be, bad and continuous invisibility is confined very largely to this particular quarter of the globe. Bad visibility is brought about by fog and mist, low clouds which cover the tops of hills, and heavy snow. Low clouds which give a clearance of 600 ft. between the ground and their bottom surfaces are no serious obstacle; lower than that flying becomes unpleasant, and eventually, if the clouds come right down to the ground, it is necessary to fly through them or over them, and at once navigational difficulties arise. It is the difficulty of flying when visibility is really bad which is the primary cause of unreliability in aerial transport today. The dangers involved are two—the possibility of losing the way and the possibility of being unable to land safely. There are broadly two schools of thought in aerial navigation amongst heavier-than-air pilots. The first is to navigate in the true sense of the word—that is, to study the weather reports on the route, and fly whichever course and whatever height offer the best weather conditions, trusting to compass and careful observation of the wind to find the way. The other is to adhere rigidly to a marked course on the ground, well provided with emergency landing places, and never to lose sight of the earth completely, no matter how low it may be necessary to fly in order to see it.

The second method is at the moment the most popular with aeroplane pilots, but it is unprogressive and unimaginative, and places the reliability of the service far too much at the mercy of the weather.

↙ The reason that pilots like it is that at present communications are so bad that rapid weather-reporting is impossible, and when leaving the ground they cannot know what the weather is like in front of them. They have probably heard what it was two or three hours before; but that is often useless in this changeable climate of ours, and they prefer to fly under the weather, and so know the worst, and be able to stop at an emergency landing-place if it becomes impossible, instead of soaring above it and trusting to finding weather at the other end possible for landing.

The first method is the right one, and is the more reliable, more comfortable and safer given one thing—really rapid and dependable weather reporting, and this can only be attained by a very efficient and complete wireless system.

Airships and big aeroplanes will undoubtedly all be provided with directional wireless in the future, from which they can plot their exact position of every quarter of an hour or so if they like. Small aeroplanes which cannot carry a navigator and have no chart-room accommodation will be provided with a pilot's telephone, by which he will be able to hear all about the weather in front of him, and in emergency will be able to ask down through the clouds over which he is flying whether the visibility below is sufficient

for landing, and, if not, will be able to hear where the weather is fit.

At present, on the Paris service, weather reports are seldom less than two hours old; some of them come from points considerably off the route, and aircraft are not fitted with wireless.

Next year, I hope, the Air Ministry will have arranged that the weather reports to the starting station will be practically instantaneous and every aircraft will be able to glean more information during its actual flight.

Since August last, up to the first of April, on the London to Paris route, 70 flights were prevented by weather out of 490 flights scheduled. The stage between London and Paris is climatically one of the most difficult in the world, and yet personally I believe that this number will be reduced to about 20 with really good wireless communication. Really bad visibility is usually very local, and if a good pilot knows that there is clear air in front of him he will push on through almost everything. It is possible also that a small directional wireless apparatus will be devised which can be worked by a pilot single-handed, and which will be used for discovering one's bearings from various wireless stations on the route.

Thus I claim that, with proper wireless communication—and this communication is within our grasp with existing apparatus—the regularity of a service will be vastly improved.

Still, having attained this standard, which, as I say, is really quite easy, we have other troubles to contend with, so far as aeroplanes are concerned.

In bad weather it will often be necessary to fly through clouds as well as over them. Some clouds are quiet and comfortable and easily traversed, but some are full of bumps, especially clouds resting on the peaks of mountains, and flying through really bad bumps, when there is no horizon to adjust one's balance by, is difficult. A slight involuntary turn produces a bank unknown to the pilot, which develops into a spiral, sometimes ending in the machine getting out of control until the solid earth comes into view again.

The antidotes to this are within our reach. First, aeroplanes can be made more stable than they are, and can be so designed as to look after themselves in the worst of bumps; secondly, a new instrument is just coming into use, called a turn indicator, which, in conjunction with the compass, should enable a pilot to avoid or correct imperceptible banks, and, thirdly, continuous experience in cloud navigation will breed a contempt for the difficulties of flying blindfold.

Another minor trouble is that in getting off an aerodrome in fog. It is difficult to keep an aeroplane straight on the ground unless some objects by which the pilot can steer are visible. I think that this difficulty can be eliminated, however, by laying down straight strips of white cloth, or laying out a chalk line along which the aeroplane can run.

Before the full advantages of aerial transport can be reaped, flying by night must be carried out to just as great an extent as flying by day. Before night flying can be carried out on commercial routes, lighting must be provided. Lighthouses must be erected on or near aerodromes, and much remains to be discovered as to the best forms of aerial lighthouse. It must have a very powerful light indeed, and, at the same time, must be so arranged as not to dazzle the pilot of landing aircraft. In civilised countries I doubt if many guiding lights will be necessary on the air routes away from the aerodromes. The lights of towns, villages, and railways should be a sufficient guide.

Lighting in fog is another problem to be solved, and a fog-penetrating light would be a great boon not only to aviation but to shipping and railways as well.

In many countries flying will scarcely ever be seriously affected by the weather either by day or night, and, indeed, in far the greatest portion of the habitable regions of the earth it is only a comparatively short rainy season that will give any serious trouble at all.

### The Financial Side

Now I come to the more sordid and serious enemy of aerial transport, finance. Aerial transport is perfectly useless from a commercial point of view unless it can be made to pay. Like all other forms of transport or communication, capital must be provided and a solid organisation created before it can pay, and I suppose, in the old days, it was just as difficult to prove that shipping lines and railway lines would pay as it is to prove the remunerative possibilities of aerial transport today. Unfortunately, at this moment of financial uncertainty, the men who have the money which could tide aerial transport over its early troubles are looking for quick profits and are afraid of it.

I will first deal with the various items of expenditure involved, and try to show how these can be reduced in the future, and give some concrete examples of actual cost in



the course of my remarks. First, it must be realised that aviation is a trade in which it is not possible to cut expenses; everything must be of the best—personnel, material, administration, fuel, etc., and it is necessary to pay highly for the best of everything. One of the dangers of competition today is that it may lead to unjustifiable economies, which in their turn will result in accidents and unreliability and a general set-back in the progress of aerial transport.

I will start by giving an estimate of the cost of the London to Paris service, the figures being based on actual experience. I cannot give you the actual figures of the present service, for obvious reasons, and they would be misleading, as the service is being conducted by aircraft designed for war, and, therefore, uneconomical for commercial purposes.

I will assume we want to run three machines a day each way between London and Paris. For this purpose I reckon that we must have 14 aeroplanes, to provide a sufficient reserve on the ground and to cover machines under repair. We will use on this service an "X" type single-engined aeroplane, flying at 110 miles an hour and carrying one ton of goods or eight passengers. This machine actually exists.

The capital costs involved are roughly as follows:—

14 aeroplanes, with engines at £6,500	91,000
Spare engines .. .. .	10,000
Other spares .. .. .	20,000
Transport vehicles, tools, etc., etc.	9,000
Working capital .. .. .	10,000
	£140,000

Thus the capital necessary is very small as compared to the money required for other forms of transport. Air-Commodore Maitland has given us some very interesting figures about airships, and they did not appear at all excessive when the capital required for starting a shipping line or a railway is considered.

Heavier-than-aircraft services require far less capital than lighter-than-air, and can be started on a much smaller scale, as, for example, our London to Paris service. It is the running costs that are comparatively high for the load carried and that are susceptible to improvement.

These running costs can be divided into two categories—ground costs, which may be somewhat illogically described as overhead charges, and flying expenses, which are only incurred when aircraft are actually in the air. The ground costs cover:—

Aerodromes and shed accommodation; weather reporting; communications and transport; basic pay of pilots; pay of personnel; perhaps insurance; interest on capital.

Now, I cannot give you the detailed figures of the London-Paris service for these ground costs without giving away secrets, but I can say that they would total about £45,000 a year, excluding insurance and interest on capital, but including a ground organisation in France which could be considerably reduced when the service is firmly established.

The Government has undertaken the responsibility of providing aerodromes, sheds and a weather-reporting system at certain fixed rates; the pay of the personnel may be considered high, but a comparatively small number are required, and, generally speaking, these charges are fairly well fixed and are not capable of very much modification.

It is when we come to flying expenses that our troubles begin:—Fuel consumption; depreciation (including cost of repairs); pilots' flying pay; (probably) insurance.

Let us assume that each of our 14 aeroplanes flies 300 hours in the year. Counting the trip to Paris as 2½ hours, including test flights, etc., this represents 4,200 hours' flying, or 1,680 trips. Reckoning on six trips a day, three each way, this requires 280 flying days in the year—a low estimate; but we will see what it leads us to statistically.

The costs are:—

Fuel for 4,200 hours .. ..	21,000
Depreciation at 50 per cent. ..	45,500
Insurance at 20 per cent. ..	18,000
Pilots' bonus at 10s. per hour ..	2,100
	£86,800

I am putting most of these charges at a very high rate. This, with the £45,000 a year ground charges, gives us an expenditure of £131,800 a year without interest on capital. This sounds a lot for 14 aeroplanes; but now let us look at the other side of the question. 1,680 trips brings this down to a cost of £18 10s. a trip. £78 10s. to carry a ton at over 100 miles an hour for 230 miles is not so bad, and works out to about 8½d. a pound, or, taking eight passengers, to £9 15s. a passenger. At the present rate of 2s. a pound, and £15 15s.

a passenger, given a full load, the service would be earning £224 a trip, or £376,320 a year if goods only were carried, and £126 a trip, or £300,000 a year if mixed cargoes were carried, always presupposing a full load.

This, as you see, gives about 100 per cent. profit on your capital.

Where is the snag? Just this. We are assuming that we shall carry 6,720 passengers and 840 tons of goods at these high rates in the year, and it cannot be done. We shall not get the assumed full load.

Now, what must we earn to "break even"? Assume 10 per cent. on our capital, and our costs go up to £145,800 a year, so we have to earn about £86 14s. a trip; let us say £87. Let us assume that we have a 35 per cent. load of passengers and a 35 per cent. load of goods, throughout the year, i.e., 70 per cent. of a full load, half passengers, half goods, a very low estimate for three machines a day, as 66 per cent. would fill two and leave only a very small load for the third. Seventy per cent. of four passengers is 2.8. Seventy per cent. of half a ton is 784 lbs., and to "break even" we must get £43 10s. for each of these, or £15 15s. a passenger and 1s. 1½d. a pound.

Thus the question reduces itself to the problem as to whether we can get more than three times this load a day each way, i.e., about nine passengers and 2,500 lbs. of parcels at these rates. If so, we can make a profit above and beyond the interest on the capital. Personally I am perfectly convinced that we can do this and a great deal more, once the public—and particularly the business man—has been educated to this new mode of travelling, and when once the reliability of the air service is established, and when extensions run on to Italy, to Marseilles, and to Spain. There is a point to note here. These calculations reckon on aeroplanes doing only 300 hours a year on 280 days in the year. This is a safe estimate; but suppose, by experience and good organisation, it is found possible to make each machine fly 400 hours. Then at once either the takings go up enormously or we can carry on with fewer machines, and so less capital, and carry the same loads at a higher profit or a lower rate.

I think, by this somewhat long rigmarole of figures, I have proved that an aerial service between London and Paris will pay, and pay well, with quite a small demand. If the passengers averaged 20 a day each way, instead of 9, and the goods 3 tons instead of 1, large profits would be made, even after the rates had been cut down considerably.

Can we also reduce the expenses of such a service? The overhead charges are not high; but the flying expenses are—particularly on the items of depreciation and fuel consumption—and to some extent on insurance. Some of these, however, we can hope to reduce. The cost of petrol is one of the great problems of the world at the moment. I can't say that I think petrol will become cheaper in the near future, but a large percentage of benzol can, and is, being used, and it should be possible to produce this considerably cheaper.

Improved design in engines and aircraft may give us the same speed and lift for a less consumption, and it is likely that the future will see power-alcohol engines, heavy-oil engines, and eventually turbines, designed for work in the air. All these should do much to reduce the cost of the fuel consumed.

Now let us turn to depreciation. Depreciation depends on two factors:—

Capital cost of the aeroplane and engine.

Durability of the aeroplane and engine.

At this moment it is difficult to see how capital cost can be reduced, at all events until commercial air services develop sufficiently to create a demand for which it would be possible to build aircraft and engines on a production basis. The cost of engines may be reduced by designing a somewhat heavier and simpler type than those in use at present, but, generally speaking, the cost of construction is likely to go up. Durability, on the other hand, can be greatly improved. Today, flying through rain causes serious damage to both propeller and fabric. Hot climates warp and split woodwork. A bad landing jars an aeroplane right through. An engine can only run at the best for 150 to 200 hours without a complete overhaul.

All these weaknesses can be eliminated. Metal propellers are nearly with us now. Complete metal construction is developing, and only needs money to become a practical proposition. Oleo-gear undercarriages will save strains in landing. Better installation will save vibration and wear and tear in the engine. In short, there should be very marked and rapid progress in durability if our private design departments can keep alive at all.

Insurance is our next large item of expenditure. I have placed this figure considerably higher than the rates which



are being charged in some cases at present. The insurance companies, in a really enterprising spirit, gave low rates for a period commencing some time last year; but I fear that they will be the losers in consequence. The rates may go up, but in some cases, where companies have proved themselves to be really efficiently administered and equipped, it is hoped that they will not. Eventually, when business becomes brisk, this figure should easily be lowered to 10 per cent., and probably less still in selected cases.

Thus you see that two of our biggest items of flying expenditure: depreciation and insurance, are definitely susceptible to appreciable reduction.

The organisation of the London-Paris service has been based on the fact that it has to compete with boat, train and telegraph in a bad climate, and it has, therefore, been equipped with high-speed aeroplanes.

If this service was going to be run in an undeveloped country, where high speed and regularity were not essential, an 80-mile-an-hour aeroplane with the same engine could be used. Its capital cost would be greater, say, £7,500, as it would be larger; but it would carry  $2\frac{1}{2}$  tons instead of 1. This machine exists on paper and is a practicable proposition. The running cost of such a machine, without overhead charges, but with percentage on capital and full pay to the pilot, flying for 300 hours in the year, would work out to £13 16s. 8d. an hour, or about 3s. 8d. a mile; 3s. 8d. a mile for  $2\frac{1}{2}$  tons at 75 miles an hour is not a bad commercial proposition, and I leave you to work out the various developments and combinations possible from that basic figure.

I have not so far mentioned the carriage of mails. It is obvious that, given reliability, the air is the best means of carrying letters, as the bulk and weight involved is comparatively small, and the gain in time is of real importance. But, unfortunately, the existing Post Office organisation is not suited for this new development without expenditure, for which authority cannot be obtained, and, in addition, international agreements make any alteration in the present system difficult. There are three methods of using aerial services for carrying postal communication:—

- (1) Guaranteed load.
- (2) Special contracts.
- (3) Aerograms.

The first is the simplest. The Government gives the aerial service a minimum weight of mails to carry every day at a fixed rate, and does the rest. This guarantees a certain daily income to the aerial service, and is merely payment for services rendered, and it is for the Government to decide what the public pays.

The second is the system prevailing at the present. The public are free to use the aerial mail at an increased rate, and the aerial service takes what it can get, giving the Post Office so much for each letter. The success of this system depends on advertisement and good ground organisation by the Post Office, as well on a sufficiently cheap rate. In the present contract none of these elements have existed, and the experiment has been a failure.

The third is a system by which messages can be telephoned direct to a Post Office on the aerodrome, and thence transferred by air to their destination, being telephoned on arrival direct to the addressees. It claims lower cost and less congestion than the existing telegraph and telephone systems, but it involves the establishment of a very good telephonic organisation, and, I think, can only be treated as a special means of communication and not a normal one. The great point of aviation is that it can carry long written communications rapidly.

I will now try to give you an estimate of running a mail service from Karachi to Constantinople, which is, to my mind, a far better proposition than the Karachi-Cairo route recommended by Lord Weir's Committee last summer, at all events as soon as Armenia is sufficiently settled to permit of it.

My proposal is that the mails should be carried by air over that portion of the route which has a reliable climate and no serious international complications, and then go on by the Orient express to London through the bad climate and the area of international complications.

Another alternative would be to run by airship to Cairo and go on from thence to Karachi by heavier-than-air service, but this would not serve the other capitals of Europe so well as my proposal, and would be going out of the way. The Cairo-Karachi route is, however, of greater military importance, and will, no doubt, be started first. I will give a rough idea of the costs involved and possibilities of a heavier-than-air service from Karachi to Cairo.

The distance to be covered is 2,700 to 2,800 miles. It can be divided into very convenient stages—Kenia, Aleppo,

Mosul, Baghdad, Basra, Bushire, Bunder Abbas, Guadir, and Karachi. The longest flight necessary is 380 miles, between Bushire and Bunder Abbas. I would suggest that we start on this enterprise with a bi-weekly service, allowing an average of only 78 miles an hour and flying only by day. The distance can be covered in 35 hours, or in three days.

This involves 7,280 hours' flying a year, and I reckon that in this comparatively clear climate 20 machines should do this easily. I am assuming that a comparatively small machine of low horse-power will be used.

The following is a rough estimate of the expenditure:—

Capital Expenditure.	
20 aeroplanes capable of carrying 1,000 lbs. or four passengers at 80 m.p.h., at £4,000 .. .. .	80,000
	£
Spare engines .. .. .	7,000
Spare parts .. .. .	40,000
Mechanical transport and communications .. .. .	20,000
Tools and miscellaneous .. .. .	20,000
Working capital .. .. .	43,000
	£210,000

I have put spares and working capital very high, but we want to be on the safe side. Annual overhead charges, including shed and housing accommodation rented from Government, pay of personnel, allowances, travelling, etc., I put at £60,000, assuming that Government really helps and does not demand full value in cash for everything done.

Flying expenses can be reckoned as follows:—

Fuel at £3 an hour .. .. .	21,900
Depreciation at 50 per cent. .. .. .	40,000
Insurance at 20 per cent. .. .. .	16,000
	£77,900
Say, with pilots' bonus, etc. .. .. .	£80,000

So we have a total annual expenditure of £140,000 to face at the very most. If we can lower insurance and depreciation, we can make considerable reductions.

This service would be able to carry 2,000 lbs. of mails each way each week—64,000 ozs. If we charged 1s. an ounce, and if we could get a full load, the income would be £316,400 a year. But this, again, merely indicates what could be made if it was possible to get a full load of mails.

Let us approach it from another direction. We are spending £140,000 on 7,280 hours' flying, which works out to about 5s. a mile. If we could earn 6s. a mile, we would make over £29,000 a year profit; 6s. a mile gives us 1s. 6d. a mile for a passenger, or 7½d. a pound per 100 miles. The problem is, can we get it?

Personally, I think, with a Government guarantee for the through mails, and special rates for letters, passengers, and parcels between intermediate stopping places, it should easily be possible, and there are certainly passengers who would pay 1s. 6d. a mile, or £210, to get from Karachi to Constantinople in three days. I have purposely put the charges high, as I do not want to be optimistic; but if we counted on each machine flying 500 hours in the year, depreciation at 33 per cent., and insurance at 10 per cent., and if we cut down our overhead charges by 15 per cent.—all quite conceivable reductions—we could run this service at about 3s. 3d. a mile and make a profit at 4s. a mile. If the demand was big enough a daily service could be run still more economically.

It may be urged that the airship is cheaper and will do the trip to India quite quick enough. Granted; but an airship cannot run so frequently and cannot call at intermediate stations. Another advantage of an aeroplane service on these lines is that it cannot completely break down. A crash or some other failure will only entail a few hours' delay, whilst another aeroplane takes over the load. Eventually, perhaps not till Australia is linked up by air to India, and when the demand for increased acceleration of mails arises, as it surely will arise, high-speed machines will be put into service and will average 100 miles an hour day and night and the Karachi-Constantinople trip will be reduced to 28 hours.

Well, enough of figures. I hope I have shown you that, given a sufficient load, aerial transport will pay. Personally I believe that the supply will create the demand, and that once a service is organised and proved reliable, there will be plenty of traffic. That is certainly one of the lessons we have learnt from the London to Paris service up to date. Now I must touch on the delicate subject of subsidies. The idea of granting a subsidy to any industry is repugnant to British ideals.



I have heard a subsidy described as a narcotic, but, in the case of aviation, I should call it a tonic. You may ask me why a subsidy should be given if I can prove on paper that aerial services will pay without. Well, my figures all depend on the amount of load obtained, and that is the uncertain factor. At present financiers will not put up money because no aerial service has yet had a chance of really making a profit; but if Government granted a subsidy, which would to some extent compensate for any shortage of load, then I believe financiers would step in and provide the capital required. Accounts are easily checked, and the subsidy can be stopped the moment aerial transport proved to be self-supporting.

A subsidy can be granted in various forms. The French allow a kilometre rate for every kilometre flown by a French aircraft with a French pilot in any part of the world and in any capacity. The rate is worked out by a very complicated formula and a sliding scale. A machine such as I assume would be used in my London to Paris example would draw something over £60 for every trip across the Channel. This to my mind is unnecessarily large, and is, therefore, really likely to act as a narcotic.

There are three possible forms of subsidy which are most generally suggested:—

- (1) A rate per mile flown.
- (2) A percentage on weight carried.
- (3) A guaranteed minimum load.

The first is the simplest, and a suggestion on these lines has already been put to the Air Ministry by the S.B.A.C., based on speed and carrying capacity. It has the disadvantage that it helps efficiency and inefficiency alike; but it is the form of subsidy most likely to encourage and increase flying efficiency generally.

The second is rather on the lines of the Biblical principle that "To him that hath shall be given." It simply means that Government pays part of the cost of the load and so enables aerial transport companies to carry for the public at lower rates than could be quoted otherwise.

The third is the most limited, but is the least repugnant

OPENING the discussion Major-General Sykes, who presided, said:

"As General Brancker has pointed out very clearly, the chief difficulty in obtaining regularity of commercial service is bad visibility. There are, however, two methods for obtaining the position of aircraft by means of wireless telegraphy, known as 'direction finding' and 'position finding.' The first system is at the present time under further development, and in a few months a reliable and serviceable article will, I think, be produced.

"The position finding system, which needs its own ground stations, requires much transmitting and occupation of the æther, and is thus comparatively costly, as several stations are concerned; whereas the direction-finding system requires no extra ground stations, and does not necessitate any transmission by wireless, as the signals made by high-powered commercial ground stations can be used to obtain bearings. This system is, at the present time, not so reliable or accurate as the position-finding system.

In flying in cloud and fog the stability of commercial aircraft is particularly important, and it is generally thought that from seaplane and flying-boat experience a "large-card" compass should be used.

"I have had a fair amount of experience in fog and cloud flying, but in my experience snow is worse. The most difficult journey from the visibility point of view that I have had was once during the Peace Conference winter when we started back from Paris when the snow was falling. At 50 ft. from the ground my pilot, Lieut. Drew, and I in an open two-seater D.H. 4 were completely out of sight of the ground. We, of course, then had none of the direction-finding instruments I have mentioned, and had to search about by our own instincts gradually through chinks in the thick layers of snow to gain height and get above it all. At one place we found a completely clear funnel of air for a height of about 400 ft., and we circled up through it. Then groping about we gradually and slowly made our way to about 10,000 ft., and found a glimmer of the sun and directed our course by it. We flew for 2½ hours at 10,000 ft. without seeing a sign of the ground, and then again groped our way down, suddenly finding ourselves among the trees and dikes between Antwerp and Bruges.

#### Openings in Persia

FROM the recent report of the Anglo-Persian Military Mission, it appears that there should be openings for ex-flying officers and men of the R.A.F. in the new forces which

to the subsidy-hater. Government guarantees a minimum load of mails to a selected air service on the approved route. For example, a guaranteed ton a week at 5s. a pound, would be a godsend to the London to Paris service, and would enable the Post Office to accelerate almost all ordinary correspondence.

However, it is for the Government to decide what they wish to encourage in aviation-speed-weight-carrying-horsepower-numbers, and to base any subsidy they may give on their own requirements.

To sum up, I hope I have proved that aerial transport will pay, given a sufficient load. I plead that this load will be forthcoming on any properly-selected route as soon as the air service on that route has proved itself reliable. I have endeavoured to show that an aerial service can be made reliable even with present material and experience. I urge that Government should take some sort of financial share in the risks until it has been established that a paying load is available. If Government would do this, I believe that the financiers, and eventually the public, would come forward and support new services and new enterprises wholeheartedly.

It may be asked why Government should wish to assist aerial transport at all.

A great and flourishing aerial transport industry will provide the country with a reserve of pilots and mechanics; it will preserve the design and manufacturing organisation, which are now crumbling to ruin; it will accelerate and invigorate all forms of overseas trade, and it will link up our old Empire by closer bonds than ever existed before. Suspected by the public and neglected by the Government, British aviation today is at a very low ebb, but, after all, in 1913 it was also starved and neglected. It was in that year that we adopted the motto, "*Per ardua ad astra*" for the Royal Flying Corps, and within our years that Corps has indeed soared "through hardship to the stars."

Those who believe in commercial aviation, those who are supporting it, and those who depend on it, may indeed inherit that motto from their warlike elder brothers, "*Per ardua ad astra*."

"Interesting experiments are being carried out which tend to solve the difficulties attending air navigation by night. It is hoped that as a result of these experiments powerful light-houses will be placed at suitable points on the great airways, enabling aviators to locate their position in clear weather during the hours of darkness. These lights should be visible from a considerable distance at any height at which a commercial machine is likely to fly. An experimental light-house is already in operation at the Croydon aerodrome.

"Local lights, which may be compared to harbour lights, will be established on or near aerodromes for the location of their position. Experiments are also being made to equip the main aerodromes with night landing lighting apparatus of the most up-to-date kind, and with the 'L' shaped lighting laid down in the International Air Convention. In addition, it is intended to equip these aerodromes with some form of flood lighting. Secondary aerodromes will be fitted with smaller apparatus, and emergency landing grounds will have wind indicators visible at night from a moderate altitude.

"Speaking of climatic difficulties, I should like to say a word on design. No British constructors have yet produced all-metal commercial aircraft, although this seems to be most desirable in certain climates. Metal propellers are still in the experimental stage. The Germans and Americans are both said to have made 'composition' propellers, but nothing is known of these. The German 'Junker' aeroplane made entirely of duralumin does away with fabric, wood and wires, but still employs a wooden propeller. The Germans have also turned their attention to the use of duralumin for hulls of flying-boats and seaplane floats.

"There are many ways in which experimental work is essential. In my opinion the most important is the engine. The aircraft motor of today is a really marvellous development, but there is still room for improvement towards the vital factor of reliability under all conditions of heat and cold, damp and dust. The problem is accentuated by the obvious fact that under the present conditions of air transport and the certainty of markets in other directions there is little incentive to motor manufacturers to spend money on design and experiment for a problematical return, and Government competitions to ensure progress in this particular direction are not a very satisfactory method."

are to be organised in Persia for military and police purposes. The equipment of the new Persian army is to include all the most modern ideas, and, of course, will include an air force.



# THE ROYAL AIR FORCE

London Gazette, April 23

## Administrative Branch

Sec. Lieut. G. V. Jennings to be actg. Capt. whilst employed as Capt. without pay and allowances of that rank; March 25, 1918, to March 13, 1919.

(Then follow the names of six officers who are transfd. to the Unemployed List under various dates.)

Lieut. C. E. Hodgson, M.B.E., relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Maj.; April 15.

The notifications in *Gazette* of July 8 and March 5 concerning Lieut. A. R. Harris are cancelled.

## Technical Branch

Flying Officer E. A. Rouch (Capt., I.A.R.O.) relinquishes his temp. R.A.F. commn. on reversion to I.A.R.O.; March 15.

(Then follow the names of six officers who are transfd. to the Unemployed List under various dates.)

Capt. R. K. Paton relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Maj.; March 12. (Substituted for notification in *Gazette* April 6.)

Lieut. R. E. Cook relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; April 16.

Flight-Lieut. H. Cox resigns his short service commn.; April 24.

## Medical Branch

(Seven officers transfd. to the Unemployed List.)

## Memoranda

(Then follow the names of 47 Cadets granted hon. commns. as Sec. Lieuts.)  
Flight-Lieut. D. F. Massy (Capt., 33rd Q.V.O., Light Cav., Ind. Army) relinquishes his temp. R.A.F. commn. on return to Army duty; March 17.

Sec. Lieut. S. P. Inman relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Dec. 31, 1919.

London Gazette, April 27

## Short Service Commissions

The notifications in *Gazette* of Sept. 12, 1919, appointing Flying Officer A. Walters (T. Met.); *Gazette*, Dec. 12, 1919, Obs. Officer P. Hardy, M.C.; and *Gazette*, Jan. 6, Flight-Lieut. D. G. Bourn (T.) to short service commns. are cancelled.

## Re-Seconding

The following Naval Officers are re-seconded to the R.A.F. for a further period of two years, except where otherwise stated, with effect from Aug. 1, 1919:—

**Squadron Leaders.**—H. B. Bonning (Ad.) (Paymr. Lieut.-Com., R.N.); H. L. Jackson (S.O.) (Paymr. Lieut.-Com., R.N.); W. G. W. Prall (S.O.) (Paymr. Lieut.-Com., R.N.); A. A. E. Robinson, O.B.E. (Ad.) (Paymr. Lieut.-Com., R.N.); G. H. Thomson, O.B.E. (S.O.) (Paymr. Lieut.-Com., R.N.); G. J. Watney, O.B.E. (Ad.) (Paymr. Lieut.-Com., R.N.).

**Flight-Lieutenants.**—G. B. Chainey, O.B.E. (Ad.) (Lieut., R.N.), until Oct. 16; K. B. S. Greig (K.B.) (Paymr. Lieut.-Com., R.N.).

The following Army Officers are re-seconded to the R.A.F. for a further period of two years, except when otherwise stated, with effect from Aug. 1, 1919:—

**Group Captains.**—L. F. Blandy, D.S.O. (Maj., Bt. Lieut.-Col., R.E.); H. C. T. Dowding, C.M.G. (Maj., Bt. Lieut.-Col., R.A.).

**Wing Commanders.**—C. Fraser, C.M.G., O.B.E., M.C. (S.O.) (Capt., N. Staffs R.).

**Squadron Leaders.**—G. G. Adeley (Ad.) (Capt., R. Ir. Rif.); H. A. R. Aubrey, O.B.E., M.C. (S.O.) (Maj., King's Shrops. L.I.); A. R. Boyle, O.B.E., M.C. (S.O.) (Maj., A. and S. Highrs.); E. G. H. Clarke, M.C. (S.O.) (Maj., E. Surre. R.); N. G. Darnell (Ad.) (Capt., R. Innis. Fus.); H. E. Day, D.S.O., M.V.O. (T.) (Maj., R.E.); H. Ellershaw (Ad.) (Maj., Manch. R.); A. W. C. V. Parr (A.) (Maj., Rif. Bde.); W. J. D. Pryce, O.B.E., D.C.M. (T.) (Capt. and Qmr., Gen. List); R. H. C. Routley (Ad.) (Capt., R. Fus.).

**Flight Lieutenants.**—G. C. Anne, O.B.E. (S.O.) (Capt., K.O.Y.L.I.); A. J. W. Barnby, O.B.E. (Ad.) (Capt., Yorks. R.); E. W. T. Beck, D.S.O., M.C. (S.O.) (Capt., R. Fus.); B. St. John Boulton, M.C. (A.) (Lt., Northants. R.); W. F. Bryant (T.) (Lieut., R.W. Surre. R.); J. M. Burd, M.C. (A.) (Lieut., R.A.); B. U. S. Cripps, M.C. (A.) (Capt., Welch R.); A. Crook (T.) (Maj., Gen. List), until date of retirement; W. J. Dew, M.B.E. (Ad.) (Capt., R.W. Surre. R.); G. W. Dobson, O.B.E. (S.O.) (Capt., 19th Hrs.), for duration of present appointment; T. Fawdry, M.B.E. (S.O.) (Lt., Loyal N. Lanc. R.); L. W. Hall (A.) (Lieut., Border R.); J. P. H. Hayes (Ad.) (Lieut., temp. Capt., R. Ir. Fus.); W. Helmore (A.) (Lieut., R.A.); G. A. Hilliar, (T.) (Lieut., Glouc. R.); W. Hodgson, O.B.E. (S.O.) (Lieut., W. Riding R.); J. S. Holloway, D.C.M. (Ad.) (Capt., Dorset R.); R. G. Home, (S.O.) (Capt., Black Watch); J. A. M. Lang, O.B.E. (Ad.) (Capt., Sherwood Foresters); C. Y. McDonald, A.F.C. (A.) (Capt., Sea. Highrs.); R. H. G. Neville, M.C. (A.) (Lieut., D. of Cornwall's L.I.); W. R. Read, M.C., D.F.C., A.F.C. (A.) (Dgn. Gds.); R. J. Sanceau (A.) (Lieut., E. Surre. R.); H. J. Segrave (A.) (Capt., Wilts. R.); F. G. Sherrieff, M.C. (Ad.) (Capt., Yorks. and Lancs. R.); R. H. C. Usher, M.C., A.F.C. (A.) (Capt., Wilts. R.); A. Wombwell (Ad.) (Lieut., Lincoln R.).

**Flying Officers.**—E. A. Baker, M.C. (T.) (Lieut., R. Sussex R.); F. H. Bowyer (A.) (Lieut., Queen's R.W. Surre. R.); R. V. Bramwell-Davis (S.O.) (Lieut., R.F.A.); K. H. Brown (A.) (Lieut., R.F.A.); C. W. Busk, M.C. (A.) (Lieut., Suff. R.); H. E. Y. Carroll (A. and S.), (Sec. Lieut., King's R. Ir. Hrs.); D. M. Cassidy, M.C. (A.) (Lieut., R.G.A.); J. E. Catherall, M.B.E. (Ad.) (Lieut., R. Warwick R.); T. O. Clogstoun (A.) (Lieut., R. Warwick R.); L. E. Cording, M.C., M.M. (Ad.) (Lieut., Rifle Bde.); E. N. T. Edwards, (S.O.) (Lieut., R.F.A.); F. C. Farrington, M.C. (A.) (Lieut., R.A.); B. D. Frost (Ad.) (Lieut., Essex R.); R. Gambier-Parry, (S.O.) (Lieut., R. Welsh Fus.); H. B. Hammond, M.C. (A.) (Lieut., R.A.); P. N. Hart (Ad.) (Lieut., Black Watch); C. F. Horsley, M.C. (A.) (Lieut., Norfolk R.); G. C. Huggard (A.) (Lieut., Ox. and Bucks. L.I.); G. R. Hunter, M.C. (A.) (Lieut., Cam. Highrs.); R. B. Luard (Ad.) (Sec. Lieut., R.F.A.); R. M. C. Macfarlane, M.C. (A.) (Lieut., R.A.); K. W. MacKichan (A.) (Lieut., R.A.); C. E. Maitland, D.F.C. (A.) (Lieut., R.A.); J. A. Mansfield, M.C. (A.) (Lieut., R. Ir. Fus.); W. H. Markham (A.) (Lieut., Manchester R.); E. H. Mayers (Ad.) (Lieut., D. of Cornwall's L.I.); L. Murphy, M.C. (A.) (Lieut., R. Ir. Regt.); H. D. O'Neill, A.F.C. (A.) (Lieut., R. Dublin Fus.); R. P. Pope, D.F.C. (A.) (Lieut., E. Surre. R.); N. G. Pring (A.) (Lieut., R.F.A.); A. F. Quinlan (A.) (Lieut., R.W. Kent R.); H. V. Robbins (T.) (Lieut., Border R.); H. B. Shephard (Ad.) (Lieut., Loyal N. Lancs. R.); A. J. G. Styran, M.C., A.F.C. (A.) (Lieut., R.A.); H. E. Tansley, M.C. (A.) (Lieut., K.R.R.C.); J. P. Walters (K.B.) (Capt., R. Dublin Fus.).

**Observer Officers.**—C. C. Abraham (Lieut., K. Shrops. L.I.); S. Barnes (Lieut., R.F.A.); H. G. Crowe, M.C. (Lieut., R. Ir. Regt.); W. E. Dowling (Capt., E. Lancs. R.); J. M. Godfrey (Lieut., R.A.); A. V. McKiever, A.F.C.

(Lieut., Seaforth Highrs.); W. W. Smith, D.F.C. (Lieut., Gordon Highrs.); H. J. Whiting, M.C. (Lieut., R.A.); D. Wills (Lieut., Northants R.).

**Pilot Officers.**—W. A. Berry (S.O.) (Lieut., Dragon Gds.); A. Cox (O.) (Lieut., R. Welsh Fus.); L. Darvall, M.C. (A. and S.), (Lieut., Yorks. R.); A. E. Evans (O.) (Lieut., E. Surre. R.); V. O. Reynolds (A.) (Lieut., Hamps. R.); I. M. Rodney (T.) (Lieut., Dorset R.); M. (G.) Ryan (O.) (Lieut., E. Lancs. R.); P. W. Smith, O.B.E. (Ad.) (Sec. Lieut., R. Fus.); C. H. Stilwell (O.) (Lieut., E. Surre. R.).

Squadron Leader F. H. Moody, M.C. (S.O.) (Maj., Indian A.), is granted a temp. commn. on seconding to the R.A.F.; Sept. 1, 1919.

## Flying Branch

**Second Lieutenants to be Lieutenants.**—(Hon. Lieut.) H. S. Hobby, M.C.; May 20, 1918. W. T. Rees; Nov. 30, 1918 (since demobilised); D. J. Lewis (since demobilised); A. Shepherd (substituted for notification in the *Gazette* of Sept. 23, 1919, D. H. Woodhouse (since demobilised); March 26, 1919. P. McNaught; July 10, 1919 (since demobilised).

**Pilot Officers (O.) to be Observer Officers.**—H. A. Castaldini; Oct. 1, 1919 (substituted for notification in the *Gazette* of March 23); J. H. Dunbar; Dec. 15, 1919 (since relinquished commn.); F. W. Foster, D.F.C., D.S.M.; Jan. 27, 1919. H. P. Flack; Feb. 10 (since demobilised).

175744 Flight Cadet S. B. Harbord is granted a temp. commn. as Sec. Lieut. (A.); Nov. 8, 1918 (since deceased).

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flying Officer G. R. Barker (Sec. Lieut., Midd'x R. (T.F.); Dec. 7, 1919. Flying Officer D. E. D. Taylor, M.C. (Lieut., R. Fus.); March 9. Flying Officer A. R. Watts, M.C. (Lieut., Cam'n Highrs.); April 13.

(Then follow the names of 24 officers who are transfd. to the Unemployed List under various dates.)

Lieut. H. Rhodes, D.F.C., relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; April 21. Sec. Lieut. (Hon. Capt.) M. S. Anthony relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain the rank of Capt.; April 20. The surname of Sec. Lieut. H. Wittup is as now described, and not as stated in *Gazette* April 6.

The notifications in *Gazette* May 27, 1919, concerning Sec. Lieut. L. A. Willmore; *Gazette*, Nov. 21, 1919, Sec. Lieut. C. A. Howe; *Gazette*, June 27, 1919, Lieut. F. W. Knox (*Gazette*, July 15, 1919 to stand) are cancelled.

## Administrative Branch

Lieut. E. T. Turner to be Lieut., from (T.); Jan. 21, 1919. Sec. Lieut. (Hon. Flying Officer) (actg. Flight-Lieut.), D.C.M., to be Lieut.; Jan. 22, 1919.

**Pilot Officers to be Flying Officers.**—G. P. Abbott; Oct. 1, 1919 (notification in *Gazette* Dec. 23, 1919, to stand); G. A. Denty; March 26.

Flight-Lieut. F. Smith (Lieut., R.N.V.R.) relinquishes his temp. R.A.F. commn. on return to the Admiralty; July 24, 1918. Flying Officer C. A. Howe (Lieut., R.A.) relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 1, 1919.

(Then follow the names of nine officers who are transfd. to the Unemployed List under various dates.)

Lieut. (actg. Capt.) G. J. Blackmore relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Capt.; April 20.

Pilot Officer P. E. Perry retires on retired pay; Nov. 6, 1919.

## Technical Branch

Sec. Lieut. R. McL. Freemantle, M.B.E., is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A), from May 1, 1919, to Sept. 17, 1919 (substituted for Sept. 5, 1919). Lieut. E. T. Turner to be Lieut., Grade (B), from (O); July 3, 1918 (substituted for *Gazette* of Sept. 24, 1918). Flying Officer (actg. Flight-Lieut.) P. M. Brambleby relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (B); Feb. 13.

**Second Lieutenants to be Lieutenants, Grade (A).**—(Hon. Lieut.) R. I. Wells; May 30, 1918. H. O. Keenan; June 6, 1919 (since demobilised).

**Second Lieutenants to be Lieutenants, Grade (B).**—(Hon. Lieut.) F. M. Rayment (since demobilised), (Hon. Lieut.) H. A. L. Way, without pay and allowances of that rank prior to May 1, 1919 (since granted short service commn.); April 2, 1918. C. H. Strike; March 21, 1919. W. B. Francis; June 3, 1919 (since granted short service commn.).

Sec. Lieut. S. C. Rose to be Lieut.; June 30, 1919, without pay and allowances of that rank prior to Sept. 12, 1919 (since granted short service commn.).

Pilot Officer J. Meadows to be Flying Officer, Grade (A); Oct. 1, 1919.

**Pilot Officers to be Flying Officers, Grade (B).**—G. W. Sturman; Aug. 5, 1919 (since granted short service commn.); R. Guy; Sept. 24, 1919.

**Pilot Officers to be Flying Officers.**—F. Barnshaw, H. Bradford, H. Buxton, M. S. Keogh, G. E. Litton, G. G. Mobsby, F. J. Pope, E. Smith, J. J. Teasdale, F. H. Whitmore, D.S.C.; Oct. 1, 1919.

**Second Lieutenants to be Lieutenants, without pay and allowances of that rank.**—(Hon. Lieut.) W. Burchall Crookes (since demobilised), (Hon. Capt.) W. V. Churchill-Longman (since demobilised); April 2, 1918. S. L. Boothroyd; Oct. 30, 1918 (since demobilised); O. T. Stone; Dec. 6, 1918. J. P. Crichton; Feb. 15, 1919. J. T. Lawlor (since demobilised), H. J. Wadkin (since demobilised); May 16, 1919. W. C. Burns; June 11, 1919 (since demobilised).

**Pilot Officers to be Flying Officers without pay and allowances of that rank.**—A. H. Simmonds, T. Sullivan, J. W. White; Oct. 1, 1919. D. Rawley; Nov. 22, 1919.

(Then follow the names of 18 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. F. P. L. Mannock (Lieut., R. Welsh Fus., T.F.), relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain rank of Lieut.; April 15.

## Medical Branch

(Three officers transfd. to Unemployed List.)

## Memoranda

Flight-Lieut. G. J. C. Maxwell, M.C., D.F.C., A.F.C., is restored to active list; April 1.

The following Proby. Flight Officers are granted hon. commns. as Sec. Lieuts.:—J. C. Coleman; Jan. 14, 1919. A. Robertson; Jan. 15, 1919. T. T. Somerville; March 19, 1919. W. D. Walker; April 15, 1919. P. J. Bailey; May 23, 1919. G. F. Fearnside; Oct. 18, 1919.

(Then follow the names of 77 Cadets granted hon. commns. as Sec. Lieuts.)  
Sqn.-Ldr. C. E. Bryant, D.S.O. (Capt., 7th Hrs.), relinquishes his temp. R.A.F. commn. on return to Army duty; April 13.

Wing Comdr. (actg. Group Capt.) B. H. O. Armstrong, C.M.G. (late Bt. Lieut.-Col., R.E.), having retired from Army, relinquishes his R.A.F. commn., and is granted rank of Col.



# AVIATION IN PARLIAMENT

## Aeronautical Ply-Wood

BRIG.-GEN. CROFT, in the House of Commons, on April 21, asked the Parliamentary Secretary to the Ministry of Munitions whether a large quantity of ply-wood was recently disposed of for an alleged sum of £160,000; if so, whether public tenders were invited or firms who had written to the Ministry asking to be informed when this ply-wood was to be sold were given an opportunity to quote; and whether a commission of 2½ per cent. was paid on the sale of this timber?

MR. HOPE: A large quantity of aeronautical ply-wood was recently sold for the sum of approximately £117,000. Public tenders for this material were not invited, because a legal doubt existed as to whether certain firms had not a prior right to offer under an existing arrangement with the Aircraft Production Department. The price obtained for this material was considered to be a very good one. The answer to the last part of the question is in the affirmative. In accordance with the normal custom of the trade, the sale was effected through a broker, who, in return, guaranteed the sale and was responsible for payment.

## Civil Aviation

MR. SUGDEN, on April 26, asked the Minister of Transport when he will be able to give details of his plans for assisting endeavour and progress in civil aviation?

SIR E. GEDDES: As I stated in my speech on March 24 the Ministry of Transport is not responsible for civil aviation. The question is therefore one which should be addressed to the Air Ministry.

MAJ. GLYN, on April 27, asked the Secretary of State for War and Air whether, in view of the present condition of a civil aviation industry in this country, he will issue as a Parliamentary Paper a complete statement in regard to the civil aviation branch of the Air Ministry, showing, separately, what results have actually been accomplished up to date; at what cost and how has the money voted been disbursed; what is the settled policy of that Department to be in carrying out the policy adopted by the Government for the future; and in what manner the Department suggests that efforts may be made to encourage the industries engaged in the manufacture of aeroplanes or parts of aeroplanes in this country?

MR. CHURCHILL: As I stated in debate on March 11 last, I hope very shortly to lay before the House a Paper by the Controller-General of Civil Aviation. I think my hon. and gallant friend will find there the detailed information to which he refers.

## Halton Camp, East

MR. TREVELYAN THOMSON asked the Secretary of State for War and Air if he will state the number of youths at the Royal Air Force school of technical training at Halton Camp, East, whose term of service with the colours expires next year; whether he considers that the cost of the training given will be recouped to the State in those cases where the boys then re-enter civil life; and whether, in the interests of national economy as well as in the interests of the youths themselves, he will consider the desirability of liberating them at once when they have civil employment waiting for them?

MR. CHURCHILL: I am informed that there are no boys at Halton serving under the conditions described in the first part of the question, and the second and third parts do not, therefore, arise.

## British Flying Officers in India

SIR W. JOYNSON-HICKS asked the Secretary of State for War and Air whether British flying officers *en route* to Mesopotamia are often stranded for a fortnight in Bombay, with no extra allowance to cover their expenses while there; and whether he will remedy the hardship?

MR. CHURCHILL: The point has not previously been brought to notice. The officers in question should, on arrival in Mesopotamia, claim from the Command Paymaster there, the travelling allowances due for the period of detention in Bombay. In case there may have been any misunderstanding, special instructions have been sent to the paymaster as to the admissibility of such claims, if received.

SIR W. JOYNSON-HICKS asked the Secretary of State for War and Air what are the existing arrangements as to the length of stay of officers and men in India; and what are the arrangements for married officers and men in that country?

This question was only intended to apply to the Air Force, but someone has put in the words "for War."

MR. CHURCHILL: I think the answer has been framed by the War Office and is intended to apply to the military. If necessary, the hon. member perhaps will repeat his question.

(As the answer referred to the Army it is not printed here.)

# AIR MINISTRY ANNOUNCEMENTS

## Summer Time in Europe

SUMMER time was introduced in Serbia on the night of April 9-10. It was introduced in Hungary on April 5, and will continue in force in that country until September 20. (A.M. Notice No. 46.)

Summer Time was introduced in Belgium on the night of February 14-15, in Turkey on the night of March 1, and in Italy on March 21. (A.M. Notice No. 48.)

## Donibristle Aerodrome

THE following arrangements have been made at Donibristle Aerodrome, which is about three miles north-east of the Forth Bridge, and nine miles north-west of Edinburgh:—A new wind-direction indicator in the form of a white aeroplane has been erected at the north-east corner of the aerodrome. The name Donibristle has been marked in the middle of the surface of the aerodrome in large flat concrete letters; it runs due north and south, the "E" being the most northerly point. Pilots should land on or near the name, as the surface at the sides of the aerodrome is rough and irregular. (A.M. Notice No. 49.)

## French Military Aerodromes

THE French Minister for War has granted permission to British civilian pilots to land on the following military

SIR W. JOYNSON-HICKS: The difficulty is that the right hon. gentleman occupies two offices, but surely an hon. member is entitled to put down, as I did, a question applying simply to the Air Force? Somebody else put in the words "for War." Are we not entitled to ask separate questions and to expect separate answers?

MR. SPEAKER: It would have made the question clearer if the hon. member had, in the body of his question, indicated his intention that it should apply only to officers and men of the Air Force. If he had put in the words to that effect it would have made it clear.

## Surrendered German Aeroplanes

SIR HARRY BRITAIN asked the Secretary of State for War and Air whether it is the intention of the Government to destroy or to make use of the German aeroplanes to be delivered as and when they are handed over?

MR. CHURCHILL: These aeroplanes will be surplus to all possible British requirements; and it has been decided that, except for some machines reserved for exhibition purposes, they shall be reduced to produce and the material sold.

## Aeroplanes, East Fortune, Edinburgh

BRIG.-GEN. WIGAN asked the Secretary of State for War and Air how many new or secondhand aeroplanes are stored at East Fortune, Edinburgh; how they are stored; when they were used last; whether they are rapidly deteriorating; whether it is intended to use them again or dispose of them; and what action is likely to be taken in the matter?

MR. CHURCHILL: At East Fortune there are at present two seaplanes and 84 aeroplanes, 33 of which are in good condition, the remainder consisting of machines which require considerable overhaul, and crashed machines. They are stored in sheds which are in good condition, the wings of the machines being removed and placed alongside the fuselages in each case. The machines were last used about 18 months ago, and the rate of deterioration is normal. They will all shortly be handed over to the Disposal Board.

## German Aircraft

MR. CHARLES PALMER, on April 28, asked the Secretary of State for War and Air whether he has seen a précis of the Report which General Masterman, head of the Allied Commission of the Air Control, is presenting to the Ambassadors' Conference in Paris, urging the necessity for immediate Allied action to force Germany to execute the clauses of the Peace Treaty dealing with suppression of military aircraft in Germany; and whether he is still prepared to trust our late enemy in regard to the 12,000 aeroplanes which, as part of the Treaty, should by now have been handed over?

MR. CHURCHILL: It may be well for me to explain that Air Commodore Masterman is not acting directly under the orders of the Air Ministry with regard to the enforcement of the Air Clauses of the Peace Treaty. Marshal Foch has been deputed by the Allies to supervise the Military and Air Clauses of the Treaty, and Air Commodore Masterman, as head of the Inter-Allied Aeronautical Commission of Control reports to Marshal Foch, who refers to the Council of Ambassadors as he sees fit. Air Commodore Masterman is of course, an officer of the Royal Air Force, and he furnishes weekly reports to the Air Ministry on the progress of his work under the Inter-Allied Commission.

MR. PALMER: Is the right hon. gentleman still fully convinced that 12,000 aeroplanes will safely arrive in this country?

MR. CHURCHILL: No, sir. The Government intend that they shall be broken down on the spot and reduced to produce and disposed of in the best possible manner.

MR. BILLING: Is the right hon. gentleman aware of the enormous commercial value to Great Britain of these large bomb-carrying aeroplanes? Will he offer them to those desiring to introduce a commercial service in this country?

COL. LOWTHER: Is it not a fact that all the clauses of the Treaty have been kept? Did not the Leader of the House give the House an assurance to that effect?

MR. CHURCHILL: I said nothing in conflict with that. No doubt there are minor irregularities with the execution, but we are not confronted with a definite refusal to carry out the purposes of the Treaty.

COL. LOWTHER: Is the refusal to surrender all the paraphernalia of war a minor irregularity?

MR. CHURCHILL: I do not admit that they are refusing. There are delays, and some of them unavoidable, owing to the chaotic conditions prevailing. We are not confronted with any direct refusal or repudiation of the obligations of the Treaty.

MR. BILLING: May I have an answer to my question?

MR. CHURCHILL: The hon. gentleman should communicate with the Disposals Branch of the Ministry of Munitions.

aerodromes in France:—Avord, Cazaux, Chateauroux, Dijon, Etampes, Istres, Luxeuil, Lyons, Malzeville, Pau, Romilly, Thionville, Tours, and at Hussein Bay in Algeria. (A.M. Notice No. 50.)

## Wearing of Uniform by Demobilised Officers

THE permission to wear uniform granted to officers, who have served in the Royal Air Force, on demobilisation from that Force, extends only to State and other ceremonial occasions. If uniform is worn the dress must be that which is appropriate to the occasion.

## Repairs to R.A.F. Marine Craft

ARRANGEMENTS have been made whereby the Admiralty will undertake on repayment repairs to the hulls and machinery, including reconditioning, of marine craft belonging to the R.A.F. The work is to be done in the dockyards if facilities exist when the repairs are required; if not, tenders are to be arranged by the yards for the work to be done by contract, the necessary supervision being furnished by dockyard officers. The Air Ministry has been asked to prepare complete defect lists in advance of the vessel's arrival at the dockyard, or other repairing port, in order that no avoidable delay may be incurred in putting the work in hand, more particularly when tenders for repairs by contract have to be arranged for.





## AERODROMES AND LANDING GROUNDS

THE Air Ministry has issued the following Notice to Airmen (No. 47), amending the Consolidated List of Aerodromes:—

LIST B.—Service stations available for civilian use.

The following aerodrome has been deleted:—

Aerodrome.	Nearest Railway station.	Nearest Large town.
Renfrew .. ..	Renfrew ..	Glasgow.

LIST C.—Stations temporarily retained for Service purposes.

The following aerodromes have been deleted:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Brooklands ..	Weybridge ..	London.
Wittering ..	Stamford ..	Peterborough.
Yate .. ..	Yate ..	Bristol.

LIST D 2.—Licensed Civilian Aerodromes at which accommodation is available.

The following aerodrome has been added:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Renfrew* .. ..	Renfrew ..	Glasgow.

\* No facilities are available at this aerodrome at present.

LIST D 3.—Aerodromes licensed as suitable for Avro 504 K and similar types of aircraft only.

Except in very few instances accommodation does not exist. The licences have been issued for limited periods only.

The following aerodromes are published as additions:—

Aerodrome.	Nearest Railway Station.	Nearest Large Town.
Aylestone Lane, Leicester.	Leicester ..	Leicester.
Rhyl, Foreshore ..	Rhyl ..	Rhyl.
Skegness .. ..	Skegness ..	Skegness.
Chessington, Leatherhead.	Leatherhead ..	London.
Forthbank, Alloa ..	Alloa ..	Alloa.

## AEROPLANE LANDING WHEELS—INFORMATION WANTED

IN connection with the "Standardisation of Aeroplane Landing Wheels," the British Engineering Standards Association find difficulty in getting any accurate knowledge as to the actual loads certain sizes of wheels will carry without sinking into the ground, and so preventing the machine from getting off, or causing it to turn on to its nose in landing. Generally speaking, it is probably not disputed that machines should be provided with wheels that will not sink excessively into the softest ground on which such machines may require to land, even when the landing made is not particularly good.

It is probable that some of our readers have had experience of landings which could provide valuable evidence in considering this problem, and the B.E.S.A. would greatly appreciate any such information.

While full particulars would be necessary before any case of a wheel sinking excessively can be investigated, the size

of the tyres and other details of construction will usually be obtainable if the name of the machine is given, from records of which the B.E.S.A. has access. It would, of course, be helpful, however, to have the fullest possible details in each case, particularly the speed of landing, and the angle, and whether the landing was gentle or otherwise.

Particulars of the weight of the machine at the time of the flight, and the load carried, and as to whether the tyres were soft or hard, should also be given. Some indication of the softness of the ground would also be useful, for instance, whether a Ford car could have been driven over it or not.

Any readers having useful information would be performing a public service if they would forward it to the Secretary of the British Engineering Standards Association, 28, Victoria Street, Westminster, S.W. 1. The information would be treated as confidential.

## THE TRAINING OF R.A.F. BOYS

THE Air Ministry scheme for the entry and training of boys for the Royal Air Force is now in active operation. One examination for entry took place (under provisional regulations) in December, but future examinations will be carried out under revised regulations which have now been issued as a booklet.

The basis of the scheme for securing a suitable class of boy for training lies in close co-operation between the Royal Air Force and the local education authorities throughout the country.

It is hoped that these authorities will be prepared to nominate boys, after careful selection, to sit for the entrance examination. Each authority may, for the present, nominate as many boys as it desires. Full information as to the scheme is being sent to the local educational authorities, and those who desire nomination are requested to apply direct to them for information.

Examinations will take place twice yearly, and candidates for entry must be between the ages of 15 and 16½ years. A limited number of candidates having special claims by

reason of parental service in the R.A.F. will be entered on the nomination of the Air Council provided the qualifying standard in the entrance examination is reached.

The examination will occupy a single day, and the curriculum includes mathematics and experimental science, English, history, geography and common-knowledge subjects. Successful candidates will be attested for ten years' Regular service and two years on the Reserve. They will receive three years' apprenticeship training in a trade and a course of education in English, civics, practical mathematics, applied mechanics, mechanical drawing and general science. During the period of training the boy's health and general welfare are given careful and continuous supervision.

At the end of three years qualified boys are promoted to leading aircraftmen, and a certain number of exceptional promise will be selected for an advanced course. Those who qualify at the conclusion of this latter course will be promoted to the rank of corporal, while some may be offered cadetships to commissioned rank.

### The Flying Boat Disaster at Felixstowe

IT is with the greatest regret that we have to record the disaster to a flying boat which occurred off Felixstowe on the morning of April 29. The Air Ministry announcement stated that the flying boat was engaged on an instructional cruise when it crashed into the sea. Squadron-Leader E. R. Moon, D.S.O., Flying Officer A. J. Fyfield, Sub-Lieut. Fonseca (from the Portuguese Navy, and I.65985 A.C.2 Bass lost their lives, but Flight-Lieut. C. O. F. Modin, D.S.C., and Observer-Officer L. H. Pakenham Walsh, D.F.C., were rescued, slightly injured.

At the inquest, on May 1, on the bodies of Squadron-Leader Moon and Flying Officer Fyfield, Observer-Officer Pakenham Walsh said that the flying boat started off all right, and it had made several practice landings on the water. After about an hour, and at 2,000 ft. up, Squadron-Leader Moon took control, as he wished to do a glide. When about 1,500 ft. up the machine received a bump on the tail, which threw the machine out of control and developed into a spin. Squadron-Leader Moon then did all he could to right the machine, but the distance from the water was not sufficient to allow of a complete recovery. The machine struck the

water on a fairly natural keel. Witness was of opinion that if they had had another 100 ft. or 200 ft. they would have got out of it all right. On striking the water the machine absolutely collapsed. It was impossible to do anything, because the boat was upside down. Witness went under, and when he came up he did not see anybody else.

The Coroner said, so far as he could make out, there was nothing wrong with the machine or the piloting. It appeared to be a pure accident. He recorded a verdict of "Death from injuries received through the sudden accidental fall of a flying boat."

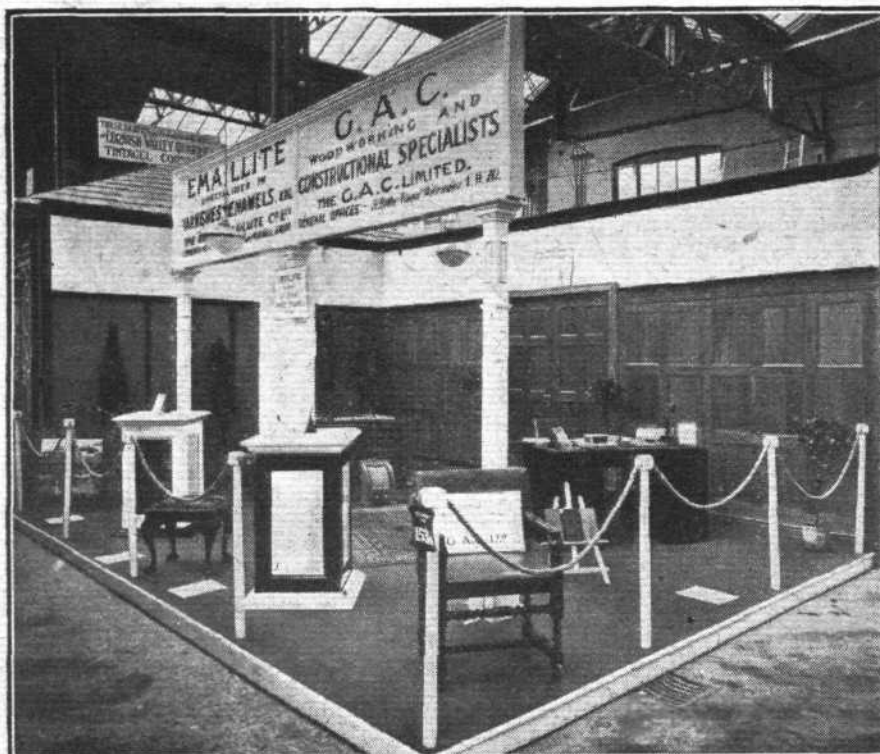
### The Rome-Tokio Flight

LIEUT. MASIERO, on one of the S.V.A. machines, arrived at Canton at 4.30 p.m. on April 21, and his companion, Lieut. Ferrarin, arrived at the same place on the following day. Capt. Ranza landed at Karachi on April 22, and on April 26 his arrival at Allahabad from Delhi was reported. In landing, however, the machine crashed, and the fuselage was broken in half; fortunately the pilot escaped injury. After being held up at Foochow for some days owing to the weather, Lieut. Ferrarin, on May 2, flew to Shanghai, landing on the Kiang San racecourse in the afternoon.



# SIDEWINDS

IN the May issue of the *Joystick* it is announced that a unification of the interests of Crossley Motors, Ltd., and A. V. Roe and Co., Ltd., has been effected and a new board of directors elected to the latter company. On this the previously-existing administration will be represented by Mr. A. V. Roe, O.B.E., and Mr. J. Lord; while the directors appointed by Crossley Motors, Ltd., are Mr. Henry Fildes,



An optical demonstration of how the G.A.C., Ltd., and the British Emaillite Co., Ltd., have turned their attention to profitable and practical account during the quiet time which aviation is temporarily going through. The photo. shows the companies' stand at the recent Building Trades' Exhibition, the whole of the fittings, the stand and furniture seen on the platform being the work of the G.A.C., the painting, etc., being done by the Emaillite Co.

M.P. (Chairman); Mr. W. M. Letts, O.B.E. (Managing-Director), and Mr. H. E. Shuttleworth.

WE are asked to make it clear that, in connection with reports which have appeared relating to a petition which has been presented for the winding-up of the Kingsbury Works, Ltd., there is no connection between this firm and the Kingsbury Engineering Co., Ltd., manufacturers of the Kingsbury Junior light-car, the Kingsbury motor-cycle, and the Kingsbury scooter.

SINCE the inauguration of civilian aviation in Great Britain on May 1, 1919, until April 24, 1920, inclusive, the records of the Handley Page commercial aeroplanes are as follows:—Total number of passengers carried, 4,460; total amount of freight carried, 69,423 lbs.; total mileage flown, 100,188 miles. As far as has been possible, these figures have been collected from all over the world, and they represent the activities of Handley Page commercial aeroplanes in the United Kingdom, France, Belgium, Holland, United States of America, India, South Africa, Poland, Scandinavia, China, Greece, Spain, etc. Handley Page commercial aeroplanes have now flown over a distance of more than 100,000 miles.

THE Apollo Plug Manufacturing Co., Ltd., have now opened a service depot and showrooms at 84A, Great Titchfield Street, Great Portland Street, W. 1, and they hope to make it a place where everyone, from the manufacturer to the private owner of a car, may call in and be sure of receiving courtesy, attention and full information without being worried to buy anything. In other words, it is sought to make it a real service depot in the true sense of the word, where those interested in ignition or warning signals may be sure of finding any assistance they may require.

AN Airco machine left Croydon for Paris on April 27, with one crate of ducks, one crate of chickens, and stores. A few days before an Airco took a spare engine for another Airco machine from London to Paris.

# COMPANY MATTERS

## Fellows Magneto Co., Ltd.

THE directors announce a dividend of 25 per cent. on the ordinary shares and a participating dividend on the 8 per cent. preference shares of 1½ per cent., making 9½ per cent. for the year. A profit of over £75,000 is estimated for the current year, and substantial sums are also being written off and carried forward.

## PUBLICATIONS RECEIVED

*The Medical Examination of Civilian Pilots, Navigators and Engineers.* C.A. Publication 1. London: His Majesty's Stationery Office. Price 6d. net.

*Rendiconti dell'Istituto Sperimentale Aeronautico.* March, 1920. No. 1. Vol. 8. Rome: Istituto Sperimentale Aeronautico, Lungotevere Michelangelo 8. Price L. 15.

*Complete Aeronautics.* Edited by Clarence Winchester. Vol. 1. To be published in three volumes. The Standard Art Book Co., Ltd., 30-32, Ludgate Hill, E.C. 4.

*Report No. 50. Calculation of Low-Pressure Indicator Diagrams.* National Advisory Committee for Aeronautics, Navy Building, 17th and B. Streets, N.W., Washington, D.C., U.S.A.

*R.&C. H.Q., 1914-16.* By Maurice Baring. London: G. Bell and Sons, York House, Portugal Street, W.C. 2. Price 8s. net.

## Catalogue

*Apollo Tubular Box Spanners.* Accles and Pollock, Ltd., Oldbury, Birmingham.

## AERONAUTICAL PATENTS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

### APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published May 6, 1920.

5,356. G. CAPRONI. Carburation. (141,079.)

### APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published May 6, 1920

3,424. R. ROZE-PERKINS. Automatic stabilisers. (141,082.)

12,459. SOC. DES ETAB. NIEUPORT. Aeroplanes. (141,085.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xxvi, xxvii and xxviii).

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